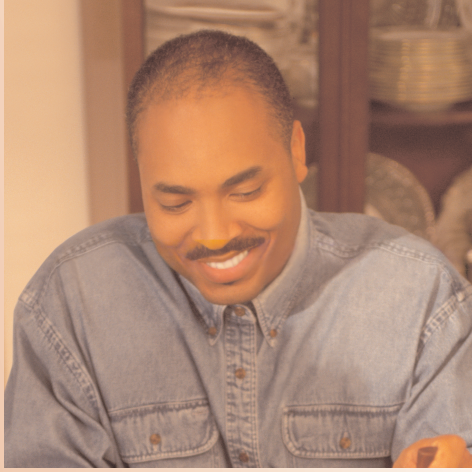
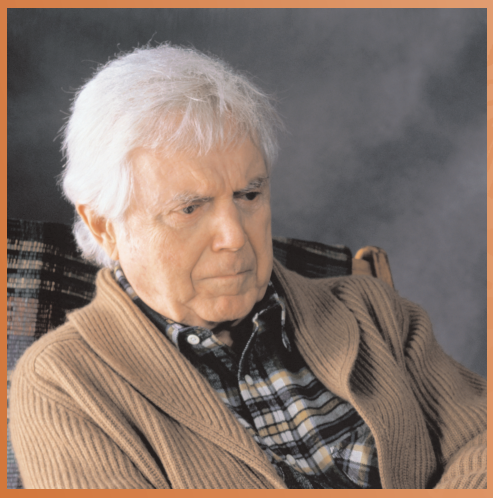
Stroke



= Brain Attack

EVERY MINUTE COUNTS!



2006 Stroke Rehabilitation Resource and Information Guide

Illinois Heart Disease and Stroke Prevention Program
Illinois Department of Public Health

Rod R. Blagojevich, Governor

Stroke

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2006

Illinois Department of Public Health
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Acknowledgments

The Illinois Department of Public Health would like to acknowledge the following sources, which provided the important information contained in this document:

- American Academy of Family Physicians
- American Heart Association
- American Stroke Association
- Illinois Department of Public Health
- Illinois Department on Aging
- National Institutes of Health (particularly the National Institute of Neurological Disorders and Stroke)
- National Stroke Association
- U.S. Centers for Disease Control and Prevention
- University of Medicine and Dentistry of New Jersey

The Department also wants to recognize the contributions made by –

- P.J. Burtle-McCredie
- Samuel Gains, Ph.D., M.D.
- Great Lakes Regional Stroke Network
- Illinois CAPTURE Stroke Registry staff
- Illinois Stroke Task Force
- STARS Support Group, Elmhurst Memorial Hospital
- Stroke Survivors Empowering Each Other (SSEEO) Steering Committee
- Beverly Wainman, R.N.C., B.S.N., M.S.N.

This publication was supported by Cooperative Agreement No. 02045 from the U.S. Centers for Disease Control and Prevention (CDC). Its contents are solely the responsibility of authors and do not necessarily represent the official views of the CDC.

Letter from the Director

While many people are aware of what a heart attack is, what its symptoms are and what to do in case one occurs, most people do not know the same things about a stroke. Yet, a stroke is an equally serious medical emergency. Rather than affecting the heart, however, a stroke affects the brain. It is a brain attack.

If you have a family member or if you are a caregiver for someone who has suffered a stroke, you know first-hand what dramatic changes this event causes, both in the life of the stroke survivor and in the lives of his/her family and friends. A stroke affects not only a person's physical and thinking abilities, but – by extension – his/her ability to work, to care for him-/herself and to enjoy even simple recreational activities. A stroke also changes a person's relationships – with family, with friends, with coworkers and with him-/herself.

This guide is intended for several audiences. First, it is important that the stroke survivor's family members understand what awaits them during those initial weeks and months of treatment and recovery. This knowledge will help them to make informed decisions about the care their loved one receives. The guide also provides them with a list of valuable resources to use as their loved one recovers.

These resources also will be of great help to another audience, namely the stroke survivor. As a person moves through the recovery process, he/she can rely on the guide's information to better understand the available therapies and to know where to turn for any needed assistance.

Finally, this guide is meant to better inform the public about stroke. Every 45 seconds, someone in the United States suffers a stroke. These brain attacks do not discriminate according to age or gender or race or economic status. In fact, four out of five families in this country will be affected in some way by stroke over the course of a lifetime.

Therefore, it is critical for the public to recognize the signs that warn of stroke and to know how to react quickly and appropriately. Remember, every minute counts when a stroke occurs.

The ultimate aim of the guide is to foster greater awareness and knowledge of stroke. For the general public, this means knowing the warning signs of stroke and taking appropriate emergency action. For those who are stroke survivors, it means understanding the obstacles along the road to recovery and independence. And, for those whose families have been touched by stroke, it means a better understanding of what has happened to your loved one.

Sincerely,

Eric E. Whitaker, M.D., M.P.H., Director
Illinois Department of Public Health

How much do you know about stroke?

How much do you know about stroke? In all likelihood – if you are like most Americans – you know very little. In fact, some experts estimate that fewer than half of those 50 years of age and older know what a stroke is, what its warning signs are, and that it poses a medical emergency requiring immediate care.

Yet, in the United States, someone suffers a stroke every 45 seconds. The victims are young and old, male and female, black and white, rich and poor. Some have many risk factors; others have none. In short, a stroke can happen to just about anyone. Therefore, it is important to learn all you can about how to prevent a stroke, how to recognize the warning signs and seek immediate emergency care, and how to negotiate the recovery process. This knowledge can make the difference between a survivor who regains much or all of his/her pre-stroke capabilities and one who does not.

This pre-test will help you to evaluate your knowledge about a stroke or brain attack. Please circle the best answer or fill in the appropriate blank for each question. If you do not know the answer to a question, this *Stroke Information and Resource Guide* can help you to learn what you need to know.

1. Stroke is a leading cause of long-term disability among adults in the United States.
   a. True b. False

2. More men have strokes but more women die as the result of a stroke.
   a. True b. False

3. Warning signs of a brain attack or stroke include –
   a. Weakness of face, arm or leg, especially on one side
   b. Trouble speaking, confusion
   c. Trouble seeing in one or both eyes
   d. Trouble walking or loss of balance
   e. Severe headache with no known cause
   f. All of the above

4. Warning signs of a brain attack or stroke usually happen over a few hours.
   a. True b. False

5. If you are exhibiting any of the warning signs of a stroke, it is a true emergency; you or someone near you must call 911 immediately!
   a. True b. False

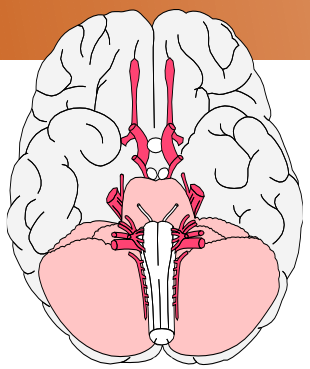
6. For the most effective treatment of stroke, a person has four hours from the time warning signs appear to seek emergency treatment at the local hospital.
   a. True b. False

7. Which of the following risk factors can make a person more prone to having a brain attack or stroke?
   a. High blood pressure, diabetes, heart disease
   b. History of a TIA (transient ischemic attack)
   c. Cigarette smoking, obesity, inactive lifestyle
   d. Stress
   e. a, b and c
   f. All of the above

8. One way to prevent a brain attack or stroke is to raise your “good cholesterol” levels. To do this, stop smoking, lose excess weight and exercise more.
   a. True b. False

9. “Assistive devices” help people with disabilities live more independently and safely. One example of an assistive device is a walker.
   a. True b. False

10. A caregiver is a nursing staff member at a hospital.
    a. True b. False



ABOUT STROKE

1. Each year in the United States, about 700,000 people suffer a stroke. This means every 45 seconds a person has a brain attack. More than 70 percent (500,000) of these strokes are first attacks; the rest are recurrent attacks.

2. ANYONE can have a stroke. People with a family history of stroke, however, are at increased risk.

3. Although men have more strokes than women, women are more likely to die. Of every five stroke–related deaths, three are women. In fact, more women die as the result of a stroke than from breast cancer.

4. African Americans have a higher incidence of stroke than whites.

5. As people age, the risk of stroke increases. After the age of 55, a person's risk for stroke doubles each decade.

6. Stroke is the third leading cause of death in the United States (behind heart disease and cancer). Someone dies from stroke about every three minutes.

7. Stroke is a leading cause of long-term disability among adults in the United States.

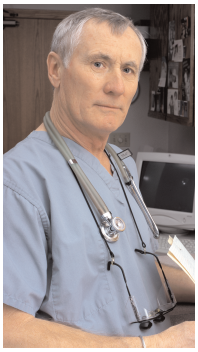
8. In the United States, the total cost of stroke is estimated to be about $43 billion a year. This includes $28 billion in direct costs for medical care and therapy and about $15 million in lost productivity and other factors.

9. The earlier a person receives treatment for a stroke the better his/her odds of recovery. Some of the more effective treatments must be administered within three hours after warning signs appear. However, the average time between when symptoms appear and when a person arrives at the hospital for treatment is around 22 hours.

10. Effective treatment and rehabilitation allows some stroke survivors to regain their independence with few or no disabilities.

11. Recurrent stroke is frequent; about 25 percent of stroke survivors will have another stroke within five years.

12. Many risk factors are modifiable. Stop smoking, get more exercise, control diabetes and hypertension, and adopt a low-fat diet.



What is a stroke?

A stroke occurs when the blood supply carrying oxygen and nutrients to part of the brain is suddenly disrupted. Deprived of oxygen and needed nutrients, cells in the affected area of the brain cannot function and begin to die within minutes.

There are two types of stroke: ischemic, in which there is blockage of a blood vessel supplying the brain, and hemorrhagic, in which there is bleeding into or around the brain. Just as a person who experiences a loss of blood flow to the heart is said to suffer a "heart attack," the person whose blood flow to the brain is interrupted or who suffers bleeding in the brain is having a "brain attack."

What causes a stroke?

An ischemic stroke is caused by a blockage of the blood flow to the brain. Blood clots are the most common cause of blockage in arteries. While clotting has many benefits throughout the body (for example, it helps to stop bleeding and allows repair of damaged areas of arteries and veins), if it occurs in the wrong place, it can disrupt the normal flow of blood, leading to a heart or brain attack. Slightly more than 80 percent of strokes are ischemic.

Ischemic strokes may take one of two forms. An embolic stroke occurs when a free-roaming clot – an embolus – formed in another part of the body (often the heart) travels to the brain and becomes wedged in a brain artery. The second kind of ischemic stroke is caused by thrombosis, or the formation of a blood clot in one of the brain's arteries. This kind of blood clot stays attached to the brain artery until it grows large enough to block blood flow, causing a thrombotic stroke.

Another cause of ischemic stroke is stenosis. This narrowing of an artery occurs as the result of the buildup of plaque (a mixture of fatty substances, including cholesterol) and blood clots along the artery wall. The most common blood vessel disease that causes stenosis is atherosclerosis, which is characterized by thickening, hardening and loss of elasticity in the large and medium-sized arteries of the body, causing decreased blood flow.

About 17 percent of strokes are hemorrhagic. These strokes occur when a weakened blood vessel in the brain breaks, allowing blood to be pumped into the surrounding tissue. This affects not only the blood supply but it upsets the chemical environment brain cells need to function. A hemorrhage can occur in several ways.

One of the most common causes is a bleeding aneurysm. This weak or thin spot on an artery wall can expand under high arterial pressure and eventually rupture and spill blood into the brain. About one in 15 people in the United States will develop a brain aneurysm during his/her lifetime. Most of them will be women (by a 3-2 ratio). Hemorrhagic stroke also may occur when arterial walls become brittle and thin due to plaque buildup and break open. High blood pressure (hypertension) can put people at even greater risk for these types of hemorrhages. Another cause of hemorrhagic stroke is arteriovenous malformations. These defective blood vessels and capillaries form tangles within the brain. Their walls are thin and rupture easily.

There are two main types of hemorrhagic stroke: subarachnoid and intracerebral. Subarachnoid hemorrhage (SAH) occurs when there is uncontrolled bleeding within the meninges, or outer membranes, of the brain, usually caused by the rupture of an aneurysm. The bleeding contaminates the clear fluid (cerebrospinal fluid) that surrounds the brain. Because the cerebrospinal fluid flows throughout the brain, this type of hemorrhage can cause extensive damage. Subarachnoid hemorrhage represents only about 7 percent of all strokes, but it is deadly – with more than a 50 percent fatality rate. Of the survivors, approximately half will suffer permanent disability. SAH rates are higher among women than among men.

An intracerebral hemorrhage (ICH) occurs when an artery deep within the brain ruptures, allowing blood to leak inside the brain. If the amount of blood increases rapidly, the sudden buildup in pressure can lead to unconsciousness or death. Advancing age and high blood pressure are the main causes of these hemorrhages. This type of stroke is twice as common as subarachnoid hemorrhages and is more likely to result in death or major disability. ICH occurs more frequently among men and is significantly more common among young and middle-aged African Americans than among whites.

Regardless of what disrupts the normal flow of blood to the brain, the result is the same. If brain cells do not receive the oxygen and nutrients they need to survive, they begin to die. Some will die immediately; others remain at risk for several hours. That is why it is critical that a person immediately seek medical care for a stroke. If the flow of blood can be reestablished quickly or if the uncontrolled bleeding can be contained, brain tissue can be saved.

What is a mini-stroke?

A transient ischemic attack, or TIA, is sometimes referred to as a "mini-stroke." It begins just like a stroke but resolves with no lingering symptoms or problems. The TIA usually lasts for a few minutes. In nearly all cases, the symptoms go away within an hour (no more than 24 hours).

A TIA still constitutes a medical emergency. At the onset of symptoms, a person should seek immediate medical assistance. Do not wait; call 911. A physician must determine whether you are experiencing a TIA or a more serious (acute) stroke. You should not simply wait for the symptoms to go away.

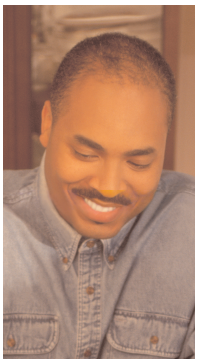
A transient ischemic attack is a warning flag that the person is at greater risk for an acute stroke. In fact, of the approximately 50,000 people who have a TIA each year in the United States, about one-third will have a serious stroke in the future. People with additional risk factors (e.g., diabetes, high blood pressure, smoking, etc.) have an even greater chance of suffering an acute stroke in the future.

What are the warning signs of a stroke?

There are five important signs that warn of a brain attack or stroke. A person may experience one or a combination of signs. **ALL OF THESE WARNING SIGNS APPEAR SUDDENLY**:

- Numbness or weakness of the face, arm or leg, especially on one side of the body
- Confusion, trouble speaking or understanding
- Trouble seeing in one or both eyes
- Trouble walking, dizziness, loss of balance or coordination
- Severe headache with no known cause

If a person experiences any of these warning signs, he/she must seek immediate emergency help by calling 911. If the person is unable to call, it is important to communicate the emergency to someone nearby. Remember, the earlier a stroke victim reaches a hospital and receives appropriate emergency care, the greater the chances for a complete recovery. The first three hours following the onset of symptoms are critical in reversing or limiting the damage done to brain tissue. Every minute counts!



Who is most at risk for a stroke?

There are a number of risk factors for stroke that no one can change, namely age, gender, race/ethnicity and family history of stroke. (Other risk factors that can be addressed through lifestyle modification and medical treatment are discussed in the Prevention section of this guide.)

While many people think that strokes only happen to the elderly, in reality, a brain attack can happen to anyone. In fact, slightly more than one-quarter of all strokes occur among people younger than 65 years of age. Generally, however, older people have a greater risk for stroke than the general population. This risk increases as a person ages. For every decade after the age of 55, the risk of stroke doubles. Two-thirds of all strokes occur in people over 65 years of age. People above the age of 65 also have a seven-fold greater risk of dying from a stroke. These facts will gain importance in the area of health care as the baby boomers move into this age group.

Gender plays a role in stroke risk, too. Men have a higher risk of stroke but more women die from stroke. Part of this is due to the fact that, because men usually are younger when they have a stroke, they have a higher rate of survival. Because women are usually older when they have a stroke, they are more likely to have other health problems that complicate recovery.

Stroke risk varies among ethnic and racial groups. African Americans, for example, suffer twice as many strokes as white Americans. And, twice as many African Americans who have a stroke die compared to whites. In fact, African Americans between the ages of 45 and 55 have four to five times the stroke death rate of whites. However, after age 55, stroke mortality among whites increases and is equal to that of African Americans. Part of this disparity is due to the fact that African Americans have a higher incidence of stroke risk factors, including high blood pressure and cigarette smoking. Some diseases, such as sickle cell anemia and diabetes, which are more common among African Americans, may put a person at greater risk for stroke, also.

Stroke incidence and mortality among Hispanics and Native Americans is similar to that of whites. The same is true of Asian Americans, even though Asians in China, Japan and other countries of the Far East have significantly higher stroke incidence and mortality than white Americans. This strongly supports the idea that environmental and lifestyle factors play an important role in stroke risk.

Finally, stroke seems to run in some families. This may be due to a genetic tendency for such stroke factors as hypertension or diabetes. It also may indicate that a common lifestyle (diet, exercise, smoking, etc.) among family members could contribute to greater risk.

Is it true that women have special risks?

It is thought that fluctuating hormone levels during different phases of a woman's life pose varying degrees of stroke risk for women. In the past – particularly during the 1960s and 1970s when birth control pills contained very high doses of estrogen – women who chose to use this type of contraception faced a greater risk of stroke. Newer oral contraceptives do not contain such high doses of estrogen and are thought to be safer. However, birth control pills can increase blood pressure. Women who smoke, especially those older than 35 years of age, face an increased risk of heart attack, blood clots and stroke.

For those women who choose to have children, pregnancy and childbirth can bring added risk of stroke. The increased risk is somewhat offset by the fact that young women of childbearing age have a very small risk of stroke to begin with. However, about eight in every 100,000 women of childbearing age suffer strokes as a consequence of pregnancy and childbirth. About 25 percent of the strokes that occur during pregnancy end in death. In fact, hemorrhagic strokes are the leading cause of maternal death in the United States.

A federally sponsored study found that the post-partum period (the six weeks following childbirth) is a particularly risky time. Data showed that, during this period, the risk of ischemic stroke is about nine times higher and the risk of hemorrhagic stroke is more than 28 times higher than for women who are not pregnant or post-partum.

Finally, women entering menopause may face a greater risk of stroke. Their declining levels of estrogen, which has been shown to increase a woman's "good" cholesterol (HDL) and to decrease her "bad" cholesterol (LDL), may play a part in this. (HDL slows the growth of arterial plaques, while LDL causes plaque to form. A more complete discussion of cholesterol can be found on page 22.) However, hormone replacement therapy – both estrogen only and estrogen plus progestin – can increase a woman's risk of stroke, according to the federal Women's Health Initiative. Postmenopausal women should consult with their doctors about the benefits and risks of this type of therapy.

Do children ever have strokes?

Yes, children do have strokes. But, they are more likely to suffer from hemorrhagic strokes than from ischemic strokes. Intracranial infection, brain injury, vascular malformations or disease, and some genetic disorders (e.g., sickle cell anemia) can cause stroke in children.

Some of the warning signs exhibited by a child having a stroke differ from those seen in adults. Children may experience seizures or convulsions. He/She may have a fever. Other warning signs – a sudden loss of speech, the inability to communicate through speech or body gestures, weakness or paralysis on one side of the body, and headache – are similar to what an adult experiences. A child showing any of these warning signs should receive emergency care immediately.

If a child suffers a stroke, his/her doctor should determine any underlying conditions and formulate a plan to manage them. Recent clinical research, for example, suggests that blood transfusions can greatly reduce the incidence of stroke in young children with sickle cell anemia.

Most children who receive appropriate treatment and rehabilitation after suffering a stroke will make a better recovery than most adults. This is largely because young brains are more able to adapt to any injury or deficit resulting from a stroke. However, children whose strokes are accompanied by seizures do not recover as well as those children who do not suffer seizures. Some children will have lingering paralysis but most will be able to eventually overcome it.

How is a stroke diagnosed?

Physicians use a number of diagnostic techniques and imaging tools to diagnose a stroke. Upon arrival at the hospital, a patient suspected of having a stroke will undergo a neurological evaluation. A doctor or nurse will ask the patient (or the person who accompanied him/her to the hospital) about symptoms and when they occurred. The patient may be asked to perform several physical and mental tests to help the doctor determine the severity of the stroke. The doctor usually orders blood tests, an electrocardiogram (EKG) and a brain scan.

Most often a doctor will order one of two types of brain scans. The most widely used procedure is the computed tomography (CT) scan. This type of scan, which takes a series of cross-sectional images of the head and brain, is readily available at most major hospitals. Results can be obtained quickly, helping the medical team to move forward rapidly with the most appropriate treatment.

This is particularly important if the person is suffering a hemorrhagic stroke because the physician will have to follow a different course of treatment. In fact, the treatment of choice for ischemic stroke (thrombolytic therapy) can increase bleeding and make a hemorrhagic stroke worse.

The other scanning procedure a doctor may use is magnetic resonance imaging (MRI). This scan uses magnetic fields to detect changes in brain tissue. An MRI offers certain advantages: the ability to more accurately detect some types of stroke damage earlier and to identify other types of brain disease (e.g., a tumor). There are also disadvantages. In most hospitals, the procedure is not immediately available at all hours. It cannot be performed on someone with certain kinds of metal or electronic implants (e.g., a pacemaker). And, it takes longer to perform.

How is a stroke treated?

There are three treatment stages for stroke: prevention, acute therapy immediately after the stroke, and post-stroke rehabilitation. (Post-stroke rehabilitation and prevention will be addressed more completely in following sections.) Acute stroke therapies include medications and surgery.

Acute stroke therapies try to stop a brain attack while it is happening by quickly dissolving the blood clot (ischemic stroke) or by stopping the bleeding (hemorrhagic stroke). If a person has reached the hospital within the first hours after warning signs appear and his/her CT scan or MRI scan shows blockage of a blood vessel to the brain, the physician will order medication, usually a thrombolytic agent. One medication, called t-PA (tissue plasminogen activator), is derived from a thrombolytic substance made naturally by the body. These kinds of drugs dissolve the blood clot, halting the stroke and, thereby, greatly reduce the degree of disability caused by the stroke. While they are very effective in breaking up a clot and restoring blood flow to the brain, they should not be administered until a physician is sure the person is having an ischemic stroke. In addition, they must be given within three hours after warning signs appear.

A stroke caused by a blood vessel breaking and spilling blood into the surrounding brain tissue requires different treatment. In many of these cases, the patient's blood pressure may be high. This must be controlled to prevent further bleeding. Surgery to stop the bleeding may be necessary. If the hemorrhagic stroke was caused by a ruptured aneurysm, a procedure called "clipping" may be performed. This involves clamping an aneurysm from a blood vessel, surgically removing the ballooned part of the blood vessel and closing the opening in the artery wall.

AT THE HOSPITAL

Regardless of the type of stroke, it is important that a person reach a hospital as quickly as possible. Someone who thinks he/she is having a stroke or someone nearby must call 911. Trained emergency medical services responders can begin to assess a person's condition immediately and relay that information to the hospital. Once in the care of emergency department personnel, a person can undergo appropriate testing to determine what type of stroke has occurred. An accurate diagnosis allows the correct treatment to be initiated quickly, thereby enhancing the chances for a more complete recovery.

What kinds of disabilities or problems are common after a stroke?

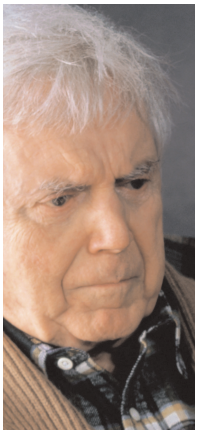
A stroke clearly affects the brain but its effects appear in other parts of the body, too. A stroke survivor may experience cognitive, emotional and speech problems, paralysis, pain and difficulties with daily living. Many of these problems will respond to therapy and to post-stroke rehabilitation programs. Others will be permanent.

Paralysis may affect one side of the body **(hemiplegia)** or one side of the body may be weak **(hemiparesis)**. The paralysis or weakness may affect a single part of the body (e.g., the face, an arm or a leg) or an entire side of the body and face. Where the stroke occurred in the brain determines what side of the body will be affected: If the stroke occurred in the left hemisphere of the brain, the right side of the body will be affected. Paralysis or weakness will occur on the left side of the body following a stroke in the right hemisphere of the brain. This paralysis or weakness can make it difficult for the stroke survivor to perform even simple daily tasks, such as walking, dressing, eating and using the bathroom. Many stroke survivors have trouble controlling their bladders and their bowels.

A stroke survivor also may have **trouble thinking, learning and remembering**. For example, a stroke survivor may not be able to keep track of dates or to follow simple directions. He/she also may be unaware of the mental or physical problems caused by the stroke. Sometimes, this can lead the stroke survivor to try to do things that are unsafe because of deficits caused by the stroke.

The stroke survivor also may be unaware of or ignore things on one side of the body. Those who suffer from this **one-side neglect** may not eat food on that side of a plate or may not put the arm on that side through a sleeve. If someone on that side speaks to the stroke survivor, he/she may turn in the other direction.

Speech is often affected by a stroke. Difficulty in forming or understanding speech is called **aphasia** and it usually is present when there has been damage to the left hemisphere of the brain. A stroke survivor with aphasia generally has the same kinds of difficulties with reading or writing. Another condition, called **dysarthria**, causes slurred speech because the muscles involved in speaking were damaged by the stroke. It is not a problem with language. Dysarthria can occur as the result of damage to either side of the brain. A related condition – **dysphagia** – affects some stroke survivors' ability to swallow.



Emotional problems may occur after a stroke. Some stroke survivors may not be able to control their emotions or they may exhibit inappropriate emotions in some instances. One common emotional problem is depression. This is not just simply a sad feeling because of the stroke. Depression can hamper recovery, complicate rehabilitation and, in severe cases, lead to suicide. As in all cases of clinical depression, many people respond well to medication and therapy.

Stroke survivors also may experience **pain, numbness or strange sensations**. These may be due to stroke damage to the brain, stiff joints or a disabled limb. A small number of stroke survivors may experience central pain syndrome (CPS), which results from damage to a part of the brain called the thalamus. The pain is a combination of sensations (heat, cold, burning, tingling, numbness, and sharp stabbing or aching pain) that is often worse in the hands and feet. Many times, the pain is made worse by movement and by temperature changes, especially cold temperatures. Unfortunately, very few effective treatments for CPS exist.

Many of these disabilities and problems may respond to rehabilitation and therapy. If a problem/disability cannot be eliminated, there are assistive devices that may help. For example, someone who has trouble walking may benefit from a walker or, if a person is having problems with nighttime incontinence, a bedside commode may help. If it becomes clear that a disability cannot be overcome, the stroke survivor may be able to learn new ways of completing everyday tasks. Throughout the recovery process, it is important for the stroke survivor and his/her caregivers to remain positive about overcoming these problems. Remember, effective treatment and rehabilitation allows many stroke survivors to regain much of their independence with few disabilities.

Is complete recovery from a stroke possible?

Slightly more than one-third of stroke survivors will recover completely or with only minor impairments. However, about half of those surviving a stroke will have impairments that will require varying levels of specialized care.

The best outcomes depend on a quick response to the warning signs of a stroke. Those who reach a hospital within the first hours after the onset of these warning signs and receive appropriate treatment are more likely to have a good outcome. Remember, the longer treatment is delayed, the greater the risk of long-term problems and disabilities. Every minute truly counts.

Also, even if a person recovers following a first stroke, recurrent stroke is frequent. About 25 percent of those who recover will have another stroke within five years. That is why it is vital that the stroke survivor and his/her family members and friends recognize the warning signs of stroke and the need to call 911 immediately.

Long-term Treatment and Rehabilitation

What kind of long-term treatment and rehabilitation is necessary following a stroke?

Stroke is a leading cause of adult disability in the United States. In order for the stroke survivor to recover as much of his/her pre-stroke capabilities as possible, life after a stroke will involve varying periods of rehabilitation. The success of the rehabilitation program depends on the amount of damage the brain sustained from the stroke, the skill of the rehabilitation team, and the cooperative effort exerted by the stroke survivor and his/her caregivers, family and friends. Progress is generally most apparent during the first three to six months after the stroke. However, some people see continued ongoing progress after the first six months.

Medication or drug therapy is commonly part of post-stroke treatment. Antithrombotics are the most popular class of drugs used to prevent a first or recurrent stroke. These include antiplatelet agents and anticoagulants. Antiplatelet drugs prevent clotting by decreasing the action of a certain kind of blood cell (platelets) that helps blood to coagulate. By reducing the risk of blood clot formation, these drugs also reduce the risk of ischemic stroke. The most widely known antiplatelet drug is aspirin.

Anticoagulants, such as warfarin (Coumadin®), heparin and enoxaparin, also reduce the clotting property of the blood. Often called “blood thinners,” these drugs are the focus of much research and many clinical trials to determine whether they are more effective than antiplatelet agents. For example, one national trial found that, while aspirin was effective in preventing a second stroke in patients with atrial fibrillation, warfarin was better for those patients who had additional risk factors.

If a doctor prescribes any of these medications, it is important that they be taken regularly and according to directions. Never simply stop taking these medications.

Who assists the stroke survivor during recovery?

Within approximately 24-48 hours after a stroke, when the patient’s condition is stabilized, a rehabilitation team will be put in place. This team of health professionals, family members and other caregivers will assist the stroke survivor along the road to recovery. All share the common goal of helping the stroke survivor to live as independently as possible.

Because a stroke can result in varying degrees of damage to the brain, a rehabilitation plan may include different components. If parts of the brain were starved of oxygen and other nutrients, brain tissue may have died. While this tissue cannot grow back, other parts of the brain, with retraining, may be able to take over and perform the function of the dead tissue. Members of the stroke survivor’s team will evaluate what functions have been affected by the stroke and tailor the rehabilitation plan to meet these individual needs.

An important goal of rehabilitation is to help the stroke survivor to relearn any lost skills. If this is not possible, the rehabilitation plan will include teaching new methods that will help the stroke survivor to compensate for any disability. These tasks require directed, focused and repetitive practice, as if the person were just beginning to learn to play the piano or to throw a baseball. Daily practice, starting with simpler tasks and progressing to more complex activities, will help to retrain damaged areas of the brain or, in other cases, to teach other parts of the brain to assist with the task at hand. Relearning lost skills will increase the stroke survivor’s independence, another goal of rehabilitation.

Another goal for the team is to assist the stroke survivor in making lifestyle changes that will help to prevent another stroke in the future. Team members will help with diet, smoking cessation and exercise programs. They will teach the stroke survivor to manage any underlying illnesses – hypertension, diabetes, atrial fibrillation – that may have contributed to the brain attack.

So, who are the members of a stroke rehabilitation team? Throughout this recovery phase, the stroke survivor will see many health care professionals, including doctors, nurses and various therapists. Here are some of the people who may be involved in the recovery process.

First, there is **the person who had the brain attack or stroke**. It is important for the stroke survivor to maintain a positive attitude and to work toward regaining strength and motor functions. With the assistance of other team members, he/she needs to set realistic goals. If the goals cannot be achieved during a set period of time, it may be necessary to re-evaluate these objectives. Remember, people who suffer a brain attack or stroke will progress differently. With courage, patience, persistence and help from team members, the stroke survivor can achieve many important goals along the road to recovery.

The stroke survivor's **family** – particularly his/her **spouse** or significant other – is on the team. Those people who will be with the stroke survivor on a daily basis during recovery and rehabilitation are critical players. In most cases, because of their close connection to the stroke survivor, they can chart improvements and identify possible problems more quickly than other team members. They can help the stroke survivor to make the best decisions about his/her care. It is important for family members to maintain a positive attitude and to reinforce the stroke survivor's progress toward his/her goals.

Rehabilitation nurses are team members. They continuously monitor the stroke survivor's condition and communicate any complications or impairments to the patient's doctor or to an appropriate specialist. Experts in helping the stroke survivor with daily living activities, these nurses will teach him/her about taking medication, will help him/her to understand any disabilities caused by the stroke, and will explain possible treatments or therapies. It is important that the stroke survivor's spouse or other family member(s) be included in the education provided by the rehabilitation nurses.

Also on the team are the **physical therapists** who will help the stroke survivor to regain physical movement skills, coordination and balance. For most stroke survivors, physical therapy will be the cornerstone of the rehabilitation process. These therapists will help the stroke survivor to relearn simple motor activities, such as walking, sitting, standing, lying down and how to switch from one type of movement to another. For example, they will teach the stroke survivor and his/her caregivers about transfer techniques (e.g., how to get from a wheelchair to a bed) and about how to walk with physical aides (e.g., a cane or a walker) if needed.

Occupational therapists will help the stroke survivor to relearn daily activities such as dressing, bathing, eating, drinking, cooking, reading, writing and toileting. Sometimes this includes helping the stroke survivor to regain functional use of an affected extremity or to effectively address visual deficits. They also can suggest appropriate changes in the stroke survivor's home to make it a safer environment. For example, they may suggest that grab bars be installed in the bathroom or that loose rugs be removed. The goal of occupational therapy is to help the stroke survivor become as independent as possible.

Another member of the team will be a **speech-language pathologist** who will help the stroke survivor to relearn language and communications skills. If speech cannot be recovered, these therapists will help the stroke survivor to develop alternative ways of communicating and help him/her to cope with the frustration of being unable to talk. With practice and patience, a stroke survivor should be able to regain some, and sometimes all, language and speaking abilities.

Sometimes a stroke will affect a person's ability to swallow, and a speech-language pathologist can help with this, too. For example, if a stroke leaves someone with numbness on one side of the mouth, the therapist can teach him/her how to drink from a straw on the other side, so the person does not choke on liquids when he/she swallows.

Social workers or **case management workers** can help with many discharge and readjustment issues the stroke survivor may face. They also can help the stroke survivor and his/her family to get in touch with community resources and answer questions concerning Medicare/Medicaid and insurance. They also will help with discharge arrangements.

A **psychologist** or **psychiatrist** can help the stroke survivor and his/her family to adjust to the emotional challenges posed by the stroke. Many stroke survivors suffer from anxiety, frustration and anger. It is particularly important that a person's family be alert to the fact that a stroke survivor often is prone to depression because of the many changes brought on by a stroke. Some stroke survivors, in fact, become so depressed that they consider suicide. Team members need to watch for signs that would indicate this. Talk therapy and medication can relieve some of these emotional and mental problems. It also may be beneficial for family members to seek psychological help to cope with the recovery process.

Vocational therapists and **therapeutic recreation specialists** can be important members of the team; they will help the stroke survivor to return to work or to regular daily activities. Vocational therapists, or career counselors, can help the stroke survivor to identify his/her strengths, to develop a résumé, to assist with job searches and to educate the stroke survivor and his/her family about rights for the disabled. If a person intends to return to a job, a vocational therapist can act as a mediator between the stroke survivor and his/her employer in how to best address any disabilities that arise due to the stroke. (The Americans with Disabilities Act offers many protections to those who are disabled; see Resources section for more information about the ADA.) Therapeutic recreational therapists will help a person to learn how to use leisure time to become healthier and more independent. They can teach the stroke survivor about using adaptive equipment that will allow him/her to enjoy the leisure activities he/she did before the stroke.

Managing the team is the stroke survivor's **physician**. He/She may consult with physiatrists (specialists in physical/rehabilitative medicine), rehabilitative neurologists or other specialists in tailoring a recovery program that meets the stroke survivor's specific situation and needs. Not only will the doctor manage the stroke survivor's rehabilitation program, but he/she also will address the person's general health. By taking care of underlying medical problems (e.g., hypertension, diabetes, etc.) and risk factors (e.g., obesity, smoking, diet, etc.), the stroke survivor's doctor will be helping the person to avoid another stroke.

What kinds of rehabilitation programs are available?

Depending on the amount of damage caused by the stroke and the effectiveness of the treatment received during the patient's stay in the hospital, a stroke survivor may go home and report for outpatient therapy, or he/she may go to another facility or unit for more inpatient rehabilitation. The stroke survivor's doctor will make this determination.

The changes a stroke makes in the brain can affect different parts of the body; these effects will have an impact on the stroke survivor's ability to conduct activities of daily living. Some common disabilities that may occur as the result of a stroke are weakness or inability to move some parts of your body (e.g., the person may be unable to move or use one of his/her arms), failure to remember recent activities, incontinence, difficulty concentrating on a task, speech problems and emotional distress (e.g., depression). During rehabilitation, the stroke survivor's team members will be there to help to address these problems through training, exercises and physical manipulation of the stroke survivor's body.

Inpatient rehabilitation therapy

The doctor may determine that it is best for the person to go to another inpatient facility for intensive rehabilitation. This facility may be separate from the acute care hospital or it may be part of the same hospital. The stroke survivor may stay in this unit for two to three weeks during which time he/she will be involved in active rehabilitative (occupational, physical and/or speech) therapy for at least three hours a day for five to six days a week. Upon discharge, the stroke survivor's doctor may determine that rehabilitation should continue in an outpatient setting.

Outpatient rehabilitation programs

These programs are usually operated by a hospital and feature access to physicians and therapists who specialize in post-stroke rehabilitation. Patients may spend one to two hours a day in therapy sessions three days a week, or as much as eight hours in day rehabilitation, but return to their homes at night.

Some **long-term care facilities** have special rehabilitation units. They also offer skilled nursing care for those stroke survivors who need this level of attention. However, these facilities generally offer fewer hours of therapy than inpatient rehabilitation units at hospitals. (See Appendix D for information on evaluating stroke rehabilitation programs in these settings.)

Home-based programs allow a stroke survivor to receive rehabilitation therapy at home. The person is able to practice needed skills in his/her own home environment. These programs work well for people who lack transportation and those who only need one type of rehabilitation therapy. If the stroke survivor has Medicare coverage, he/she must meet the program's "homebound" requirements to qualify for payment. The stroke survivor's social worker or case management team member can help with this. One disadvantage of a home-based program is that some specialized rehabilitation equipment cannot always be made available in the home setting.

What options are available for stroke survivors who need continuing or specialized care and for their caregivers?

Some stroke survivors will not recover all of their previous capabilities. The amount and type of care these individuals require will vary. Some will need very little assistance in day-to-day living and will be able to stay in their homes. Others will not be able to live at home because they require specialized nursing care. These varying degrees of need are reflected in the range of available care options. The stroke survivor and his/her caregiver can obtain additional information about the following programs and services from the social worker/case manager, the local health department, or the local senior/community center or area agency on aging. A handy place to start the search is with the Illinois Department on Aging Web site (www.state.il.us/aging); or call the agency's Senior Helpline at (800-252-8966).

Residential care

About 50 percent of stroke survivors will suffer impairments that will require specialized care at home or placement in a nursing home or some other type of long-term care facility. If a stroke survivor must be placed in a facility, there are several options, depending on the level of care he/she requires.

In Illinois, **nursing homes** can provide skilled, intermediate and shelter care, depending on the needs of the resident. There are approximately 1,200 long-term care facilities in the state. Selecting the one that is best for the stroke survivor depends on many factors. There are several resources that can help in locating an appropriate facility. The Illinois Department of Public Health, which regulates the state's nursing homes, has information on these facilities and offers suggestions on how to select one that best fits a person's needs (www.idph.state.il.us). (Should you have complaints about a nursing home, call the Department's nursing home hotline, 800-252-4343.) Another resource is the Web site maintained by the federal Centers for Medicare and Medicaid Services (www.medicare.gov/Nursing). It allows a person to compare certain features and characteristics of nearly 17,000 federally certified facilities. (See Appendix D for important rehabilitation considerations when selecting this level of care.)

If the stroke survivor will require only limited nursing care as well as assistance with personal care, there are two, less institutional options: **assisted living facilities** and **shared boarding facilities**. Assisted living facilities provide living units, similar to private apartments. Shared housing facilities are limited to 16 residents and provide a boarding house-/dormitory-like setting. Both types provide the same level of care that is offered in shelter care facilities and partially overlap the services found in intermediate care facilities.

Beware of anyone promoting a **board and care home**. These boarding houses are defined as any residence with fewer than 12 adults not related to the operator. Contrary to their names, these homes are not allowed to provide any care.

Retirement communities

If the stroke survivor regains a high degree of independence, he/she may want to consider living in an apartment in a retirement community. Generally, a resident of one of these communities must be able to cook his/her own meals or arrange to have meals delivered to the apartment. Some of these facilities, however, may provide one to two meals a day in a common dining room. Assistance with personal care, laundry service, housekeeping service, social services and transportation are usually available. Emergency pull cords in the bathroom and bedroom, and 24-hour security may be provided. Some of these communities also have assisted living units available. If the stroke survivor is not totally independent but does not need to be in a nursing home, this may be an appropriate option.

Community resources

Home health care is an option for those who want to keep the stroke survivor at home. Services vary and may include skilled nursing care and rehabilitation care. These agencies are licensed and regulated by the Illinois Department of Public Health. The Visiting Nurses Association, public health departments, hospital-based home health departments and private home health agencies often offer these types of services. Check with the Illinois Department on Aging's Community Care Program. It helps those who meet program criteria and who might otherwise need nursing home care to remain in their own homes by providing in-home and community-based services.

Much like the facilities that serve young children, **adult day care centers** are places where adults who need supervision and/or have limited care needs can go during the day and return to their homes at night. Many of these facilities are located in a hospital setting and have nurses present. The nurses will make sure the stroke survivor receives his/her medication on time and that he/she receives appropriate meals. Other advantages include the opportunity to interact with other people and to participate in social activities. Adult day care facilities are especially appropriate if a spouse/caregiver works outside the home or needs some special time alone and does not feel comfortable leaving the stroke survivor alone at home.

Home-delivered meal service (e.g., Meals on Wheels) is available in many areas, although it may be restricted to serving only those who are 60 years of age and older. If a person is eligible, a volunteer will deliver a warm meal to his/her home around lunchtime each day. Some programs offer more than one meal a day. And some may even offer special diets (e.g., low-sodium, low-fat, lactose free, etc.). Programs vary from area to area, so it is best to check with the local provider. To find the local Meals on Wheels provider, check with the area agency on aging or visit the Meals on Wheels Web site – www.mowaa.org – and use its locator services. The organization also can be contacted directly: Meals On Wheels Association of America, 203 S. Union St., Alexandria, VA 22314; telephone 703-548-5558, fax 703-548-8024.

A **friendly visitor** program sends a volunteer to a person's home for regular visits. The volunteer may simply spend time talking with the homebound person or he/she may run errands, do grocery shopping, etc. Volunteers also call on the phone to see how a person is doing. This service, which is available in many states, targets elderly people living alone and those with disabilities. Friendly visitors, including those who make hospital visits, are one feature of Illinois' Retired Senior Volunteer Program (RSVP). The state's Department on Aging helps to fund RSVP in 23 Illinois communities through the Corporation for National Service's Senior Corps program. Go to the Department on Aging Web site (www.state.il.us/aging); or call the agency's Senior Helpline at (800-252-8966). The American Heart Association/American Stroke Association has a similar program. The Peer Visitor Program, launched nationally in 1998, matches specially trained stroke survivors and caregivers with more recent stroke survivors, caregivers and families. The program strives to help those families touched by stroke to better understand the physical, mental and emotional changes that accompany a stroke. To learn more, contact the state or local chapter of the American Heart Association.

Other resources

The **American Stroke Association**'s Stroke Family Support Network can put a stroke survivor or his/her caregiver/family in touch with someone who has been through the recovery process. (Call 888-4-STROKE [888-478-7653].) While talking on the telephone does not replace personal one-to-one contact, it has often been found to be beneficial to those who are going through the recovery process.

Support groups are usually provided by the local hospital for patients who have had a stroke. Becoming involved with one of these self-help groups can be one of the most important steps a stroke survivor and his/her family can take on the road to recovery. There, the stroke survivor and caregiver(s) will find other people who have had similar experiences. They can provide emotional support, advice, comfort and a positive outlook on life after stroke. Support groups usually meet once a month for one to two hours.

Stroke survivors and their families may want to take advantage of two free periodicals. ***Stroke Connection Magazine*** features stories, poetry and letters by persons who have had a stroke and their caregivers. In addition to offering a forum for the sharing of these personal experiences, the magazine, which is published by the American Stroke Association six times a year, provides practical tips on how to deal with everyday problems commonly encountered by stroke survivors and the most updated information on stroke research and public policy. You can get a one-year subscription by calling 888-4-STROKE (888-478-7653). Another magazine, ***Stroke Smart***, published by the National Stroke Association every other month, contains real-life stories, tips and ideas on how to make a stroke survivor's life easier, the latest in stroke research, and information on money and insurance issues. A one-year subscription is available by going to the NSA's Web site (www.stroke.org) or by calling 800-STROKES (800-787-6537).

Who pays for these services?

There are three primary sources that may be tapped to cover the costs associated with the long-term treatment and rehabilitation of the stroke survivor: private health insurance, government programs (e.g., Medicare and Medicaid) and personal resources. Private health insurance and government programs cover various costs but each may limit the level of coverage. It is advisable for the stroke survivor or his/her family to contact the person's health insurance company and/or Medicare/Medicaid to determine what costs will be covered and what limitations may apply. The stroke survivor's treatment team should include a social worker/case management worker who will be able to help the family with these payment issues. For more information about insurance and payment information, see Appendix C.

How can a stroke be prevented?

Therapies to prevent a first or recurrent stroke are based on treating an individual's underlying risk factors, such as hypertension, atrial fibrillation and diabetes. Drug therapy also may be part of the prevention plan. Antithrombotics (antiplatelet agents and anti-coagulants) comprise a popular class of drugs used to prevent stroke.

What can be done about risk factors for stroke?

It is important to know the risk factors that make a person more apt to have a brain attack or stroke. Some of these risk factors – age, gender, race/ethnicity and a family history of stroke – cannot be changed. Others can be addressed through appropriate medication and by adopting a healthier lifestyle.

Here are 10 risk factors for stroke that a person can do something about:

1. High blood pressure (hypertension)
2. Heart disease
3. Diabetes
4. Transient ischemic attack (TIA)
5. Carotid artery disease
6. Cigarette smoking
7. Not being physically active
8. Obesity
9. Excessive alcohol intake
10. Substance abuse

Each risk factor will be discussed in detail along with suggestions on how to effectively address it.

High blood pressure or hypertension is a silent disease. Many times, a person will have no signs or symptoms. This is why it is important to have regular medical checkups. If you find out you have high blood pressure – it should be less than 140/90 – it needs to be controlled. Check with your doctor about lifestyle changes you can make to lower your blood pressure. He/She may suggest adopting a healthier diet, one low in salt, fat and cholesterol. If you are overweight, you may be advised to lose some pounds. If you have a sedentary lifestyle, your doctor can help you to develop an exercise plan. If your doctor prescribes medication for your blood pressure, be sure to take it as ordered. Do not skip any medication, even if you start feeling better and your blood pressure drops to within normal limits. If you stop taking your medication, your blood pressure will go up. People with uncontrolled hypertension are nearly seven times more likely to have a stroke than those who keep their blood pressure down.

If you have **heart disease**, you are more prone to have a stroke. In fact, after high blood pressure, the second most important risk factor for stroke is heart disease. This includes malformations of the heart valves or of the heart muscle. Another disease of the heart that increases a person's risk of stroke is atrial fibrillation, or the irregular beating of the heart's left upper chamber. This creates an uneven flow of blood and the occasional formation of clots that can leave the heart and travel to the brain where they cause a stroke. Atrial fibrillation affects more than 2 million people in the United States, most of them older, and increases their risk of stroke by 4 percent to 6 percent. In people 80 years of age and older, atrial fibrillation is directly responsible for one of every four strokes.

Controlling your diet and blood pressure, and increasing the amount of time you exercise will help to prevent the clogging of your arteries with plaque, a leading factor in heart attacks and brain attacks. Ask your doctor for suggestions on diet and weight loss and on an exercise program that will be safe for you. You should also pay attention to your cholesterol levels. If your doctor prescribes medication to control your heart disease, be sure to take it as ordered.

What is cholesterol?

Cholesterol is everywhere. Ads for drugs that reduce a person's cholesterol are in magazines and on television. Health fairs routinely offer testing. But, what exactly is cholesterol? This waxy, fat-like substance is found in all cells of the body. A certain amount is needed by the body to stay healthy. For example, it is used to make hormones, vitamin D and substances that help to digest foods. A person's body makes all the cholesterol he/she needs. A diet high in saturated fat and cholesterol can result in an overload in the blood stream and that can be dangerous.

Here's why. Blood is watery and cholesterol is fatty. Just like oil and water, the two do not mix. So, in order to travel in the bloodstream, cholesterol is carried in small packages called lipoproteins. The small packages are made of fat (lipid) on the inside and proteins on the outside. Two kinds of lipoproteins – high-density and low-density – carry cholesterol throughout your body. It is important to have healthy levels of both.

There are different types of cholesterol in the body: good cholesterol (high-density lipoprotein, or HDL), bad cholesterol (low-density lipoprotein, or LDL) and triglycerides. To prevent stroke and heart disease, it is important to increase the good cholesterol and to decrease the bad cholesterol and triglycerides. Elevated levels of LDL and triglycerides can lead to a condition known as atherosclerosis, or hardening of the arteries, which is characterized by the development of plaque, thick, hard deposits that can damage and clog arteries.

HDL carries about one-fourth to one-third of blood cholesterol. It is believed that HDL carries cholesterol away from the arteries and back to the liver, where it is passed from the body. Some medical experts contend that HDL removes excess cholesterol from plaques and thus slows their growth. High levels of this "good" cholesterol seem to protect against heart attack. Low levels (less than 40 mg/dL in men; less than 50 mg/dL in women), on the other hand, can indicate a greater risk of heart disease and stroke.

Low-density lipoprotein is the major cholesterol carrier in the blood. If too much circulates in the blood, however, it can slowly build up on artery walls, forming plaque. If a clot (thrombus) forms near this plaque, it can block the blood flow to part of the heart muscle or to the brain, resulting in a heart attack or brain attack. That is why LDL cholesterol is called "bad" cholesterol. A high level of LDL cholesterol (160 mg/dL and above) poses an increased risk of heart disease and stroke. If a person has been diagnosed with heart disease or has had a previous stroke, his/her LDL cholesterol should be less than 100 mg/dL.

Triglycerides are the chemical form in which most fat exists in food as well as in the body. They are also present in blood plasma and, in association with cholesterol, form the plasma lipids. Triglycerides in plasma are derived from fats in the food people eat or they are made in the body from other energy sources, like carbohydrates. Calories ingested in a meal and not used immediately by tissues are converted to triglycerides and transported to fat cells to be stored. Hormones regulate the release of triglycerides from fat tissue so they meet the body's needs for energy between meals. A normal triglyceride level is less than 150 mg/dL.

Cholesterol Guidelines*

The following cholesterol guideline recommendations were developed by NCEP:

Total Blood Cholesterol	Desirable	Less than 200mg/dL
	Borderline-high	200 to 239mg/dL
	High	240mg/dL
HDL (Good) Cholesterol	Desirable	Above 40mg/dL
LDL (Bad) Cholesterol	Optimal	Less than 100mg/dL
	Near/Above optimal	100 -129mg/dL
	Borderline-high	130 -159mg/dL
	High	160- 189mg/dL
	Very High	190mg/dL and above
Triglycerides	Normal	Less than 150mg/dL
	Borderline-high	150-199mg/dL
	High	200-499mg/dL
	Very High	500mg/dL and above

**Note: New cholesterol guidelines were adapted by NCEP on May 15, 2001.*

If you have **diabetes**, your risk of stroke is two to four times higher than those who do not have the disease. Diabetes affects the body's ability to produce and/or use insulin, a hormone that allows cells to absorb glucose, the body's main source of fuel. If the body produces too little (or no) insulin, glucose builds up in the blood and can reach dangerous levels. The disease is categorized according to the age at which it develops. Type 1 usually occurs during childhood or adolescence, and type 2, the most common form, generally occurs after age 45. (There is also gestational diabetes, which can occur during pregnancy. It usually goes away after birth but can recur in subsequent pregnancies.)

Diabetes can seriously harm blood vessels throughout the body, including those in the brain, which increases the risk of stroke. High blood glucose levels contribute to hardening of the arteries (atherosclerosis), thicken capillary walls and make blood stickier – all significant risk factors for ischemic stroke. The disease also can cause small vessels to leak, reducing blood flow to the body tissue.

If blood sugar (glucose) levels are high at the time of a stroke, brain damage may be more severe and extensive. This occurs because, when the brain is deprived of oxygen, the body breaks down glucose differently. The byproducts of this process, which can be found in and around the area of dead tissue, are toxic to brain tissue. If blood circulation is restored to the area, these byproducts will continue to poison brain tissue, further increasing the size of the dead/damaged area.

Treating diabetes can delay or prevent the onset of complications that increase the risk of stroke. Healthy eating, physical activity, and insulin via injection or an insulin pump are the basic therapies for type 1 diabetes. Those with type 2 diabetes, in consultation with a doctor, should adopt a healthy diet, increase their level of physical activity and monitor their blood glucose levels. In addition, many people with type 2 diabetes require oral medication, insulin injection, or both to control their blood glucose levels. It also is important that they lower their cholesterol level, control their blood pressure and stop smoking. Some research indicates that low doses of aspirin may prevent heart attacks and strokes, but this treatment regimen should only be undertaken with the knowledge and direction of a doctor. Any questions about diabetes or how to best manage the disease are best answered by a doctor.

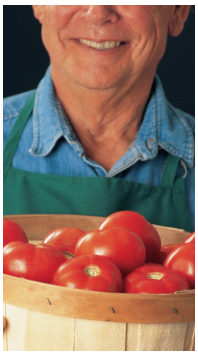
A **transient ischemic attack** (TIA) is a mini-stroke. It is a warning flag that something is wrong. A person suffering a TIA may develop several symptoms or warning signs of a stroke but they go away in a short time (they usually pass within an hour). It is still important to go to a hospital immediately. Do not wait; call 911. A doctor is the only person who can determine if you are having a TIA or a stroke. The diagnosis usually requires a CT scan or MRI to rule out a brain attack. More than one-third of those who have a TIA will have a stroke in the future. Working with your doctor, you can determine any underlying factors that may have contributed to the TIA. Medication and lifestyle changes may help to prevent a stroke in the future.

The carotid arteries are the big blood vessels on both sides of your neck that supply blood to your brain. If you have **carotid artery disease**, this means plaque has collected on the inside of these blood vessels. Depending on the amount of plaque present, blood flow through these vessels may become progressively restricted. Plaque also may cause a blood clot to form in these arteries. In some cases, the arteries may become so clogged with plaque that there is no blood flow, which can cause a stroke. Your doctor can order tests to determine if you have carotid artery disease, If so, there are various medical treatments to clean the arteries of the plaque.

If you **smoke cigarettes**, stop. (You should not use any other forms of tobacco.) Besides increasing the risk of stroke, smoking contributes to many medical problems, including heart disease, lung disease and cancer. The nicotine in cigarettes raises blood pressure and, with it, the chances of developing hypertension. Cigarette smoke contains more than 4,000 chemicals – some of them carcinogenic – and can thicken the blood, making it more likely to clot. Even second-hand smoke, because it contains the same chemicals, has been linked to greater risk of stroke. Cigarette smoking also damages the lining of blood vessels and reduces the amount of oxygen the blood is able to carry.

A study published in the May 2003 issue of the American Heart Association's journal *Stroke* showed that the risk of stroke increases depending on how many cigarettes a day a person smokes. The study also found that former smokers and those who had never smoked had the same risk for all kinds of stroke, suggesting that quitting smoking can reduce the risk of stroke. So, if you smoke, check with your doctor, a nearby hospital or your local health department for more information about smoking cessation classes or clinics. The Illinois Department of Public Health operates a Quitline; call 866-Quit-Yes (866-784-8937).

Not being physically active and **obesity** can increase your risk of high blood pressure, high blood cholesterol, diabetes, stroke and heart disease. Regular exercise and a proper diet will help you to stay healthy. For example, regular exercise has been shown to increase HDL (good cholesterol) levels and to decrease triglycerides levels. So, don't be a couch potato. Check with your doctor; he/she will help you to put together an exercise plan that will help you to safely increase your activity level. Ideally, try to do some form of exercise for 30 minutes a day at least five days a week. Enroll a family member or friend in your exercise program; people tend to exercise more routinely when someone else participates.



A proper diet can help to fend off obesity. When you are overweight, your heart has to work harder to pump blood through your body. This puts excess stress on your circulatory system, which can damage blood vessels. Ask your doctor to determine your perfect weight for your height. One method your doctor may use to determine your proper weight is to calculate your body mass index (BMI). The BMI formula assesses body weight relative to height. BMI values above 25.0 are considered overweight. Values greater than 30.0 are defined as obese. To calculate your BMI, take your weight in pounds and divide it by your height in inches squared; multiply that number by 703. Regardless of what method your doctor uses to determine if you are overweight, he/she can recommend a diet plan that will help you to achieve a healthy weight.

If you do drink, do so in moderation. **Excessive alcohol intake** can raise your blood pressure and lead to stroke and heart disease. If you are a man, limit yourself to two drinks a day; if you are a woman, you should have only one drink a day.

Besides being against the law, **substance abuse** (e.g., cocaine, crack cocaine, methamphetamine, etc.) can cause a stroke or heart attack. Cocaine (or "crack") causes a sharp increase in blood pressure that could rupture a blood vessel leading to or inside the brain. Smoking amphetamines (crystal meth, ice, etc.) or injecting drugs into the blood stream also can result in stroke. This kind of drug use among teens and young adults is being credited by some researchers for an increasing percentage of strokes in this population.

If you have an alcohol or substance abuse problem, talk to your doctor about various treatment options. The Illinois Department of Human Services Web site – www.dhs.state.il.us/oasa/ – offers information about a number of programs aimed at alcohol and other substance abuse as well as a link to a national substance abuse treatment locator, which is maintained by the federal Substance Abuse and Mental Health Services Administration.

NOW, how much do you know about stroke?

Now that you have read through this *Stroke Information and Resource Guide*, how much do you know about stroke? You should know what a stroke is, how to recognize one, and what to do if warning signs appear. Remember, this knowledge is power. It can help you to identify and address risk factors that may prevent a stroke. It can help you to recognize the warning signs that indicate a stroke. And, it can underscore the importance of receiving immediate emergency care if warning signs are present.

So, take this post-test and evaluate how much you have learned. Your life or the life of someone close to you may depend on it.

1. Stroke is a leading cause of long-term disability among adults in the United States.
   a. True b. False

2. More men have strokes but more women die as the result of a stroke.
   a. True b. False

3. Warning signs of a brain attack or stroke include –
   a. Weakness of face, arm or leg, especially on one side
   b. Trouble speaking, confusion
   c. Trouble seeing in one or both eyes
   d. Trouble walking or loss of balance
   e. Severe headache with no known cause
   f. All of the above

4. Warning signs of a brain attack or stroke usually happen over a few hours.
   a. True b. False

5. If you are exhibiting any of the warning signs of a stroke, it is a true emergency; you or someone near you must call 911 immediately!
   a. True b. False

6. For the most effective treatment of stroke, a person has four hours from the time warning signs appear to seek emergency treatment at the local hospital.
   a. True b. False

7. Which of the following risk factors can make a person more prone to having a brain attack or stroke?
   a. High blood pressure, diabetes, heart disease
   b. History of a TIA (transient ischemic attack)
   c. Cigarette smoking, obesity, inactive lifestyle
   d. Stress
   e. a, b and c
   f. All of the above

8. One way to prevent a brain attack or stroke is to raise your "good cholesterol" levels. To do this, stop smoking, lose excess weight and exercise more.
   a. True b. False

9. "Assistive devices" help people with disabilities live more independently and safely. One example of an assistive device is a walker.
   a. True b. False

10. A caregiver is a nursing staff member at a hospital.
    a. True b. False

Conclusion

A stroke is a devastating event that can rob a person of many capabilities – the ability to prepare a meal or to get dressed or to follow simple instructions. It upsets a person's emotional stability. It can even rob a person of his/her personality. Many stroke survivors are able to overcome some, or even all, of these obstacles and reclaim their capacity to live an independent life. Others will have to learn to cope with varying degrees of disability.

Good news hovers on the horizon. Researchers, in the laboratory and in clinical trials, continue to vigorously pursue more effective preventive interventions, better ways to treat acute stroke, and improved rehabilitative techniques and methods. Their efforts are sure to yield better outcomes for many of the 700,000 people who suffer a stroke each year in the United States.

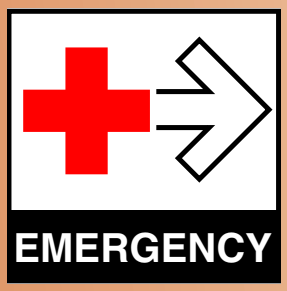
Still, the most important player in stemming the death and disability caused by brain attacks is you. Everyone needs to know what a stroke is, what warning signs indicate one is occurring, and that it constitutes a medical emergency requiring immediate action. If you observe a person who seems to be exhibiting any of the warning signs of stroke – or if you experience any of them – it is critical that you or someone else call 911 immediately. Quick medical intervention can halt the progress of the stroke, thereby saving brain cells and limiting long-term damage. Every minute does count.

Remember these five important warning signs –

- Sudden numbness or weakness of the face, arm or leg, especially on one side of the body
- Sudden confusion, trouble speaking or understanding
- Sudden trouble seeing in one or both eyes
- Sudden trouble walking, dizziness, loss of balance or coordination
- Sudden severe headache with no known cause

If you witness anyone experiencing these warning signs –

Call 911 immediately. Every minute counts.



Books

Each of the following books provides valuable information in" lay terms" about disease and personal health. Check local libraries for availability.

Beers, M., A. Fletcher, T. Jones, R. Porter, M. Berkwits, and J. Kaplan. *The Merck Manual of Medical Information*. 2d ed. (home ed.). New Jersey: Merck & Co. Inc., 2003.

Caplan, L. *Stroke*. New York: Demos Medical Publishing, 2005.

Harrington, C. *Barrier-Free Travel: A Nuts and Bolts Guide for Wheelers and Slow Walkers*. 2d ed. New York: Demos Medical Publishing, 2005.

Hutton, C. *After a Stroke: 300 Tips for Making Life Easier*. New York: Demos Medical Publishing, 2005.

Izenberg, N. *Human Diseases and Conditions*. Vol. 3. New York: Gale Group, 2000.

Olendorf, D., C. Jeryan, and K. Boyden. *The Gale Encyclopedia of Medicine*. Vol. 4. Detroit: Gale Research, 1999.

Agencies, Associations and Organizations

This is by no means an all-inclusive list of agencies, organizations, community resources and support groups or of the services available to the stroke survivor and his/her caregiver. Please consult with members of the post-stroke rehabilitation team about additional sources of assistance and support. Your local library, hospital, health department, senior/community center and support groups also can help you to locate the resources you need.

ABLEDATA

8630 Fenton St., Suite 930
Silver Springs, MD 20910
301-608-8998 or 1-800-227-0216
Fax 301-608-8658
www.abledata.com

ABLEDATA provides a national database of resources for assistive technology and rehabilitation equipment information. "Assistive devices" help people with disabilities live more independently and safely. One example of an assistive device is a walker. Fact sheets, distributors, product descriptions and catalog information are available. PLEASE NOTE: This agency does NOT produce, distribute or sell these products; it only provides information on how to reach manufacturers or distributors.

Access-Able Travel Source LLC

P.O. Box 1796
Wheat Ridge, CO 80034
303-232-2979
Fax 303-239-8486
www.access-able.com

Access-Able will assist you and your caregiver with relaxation and leisure activities to balance your life with fun and relaxation. A wide variety of travel resources are available in its database, including information about world travel. The company's focus is on assisting disabled persons and their families with recreational activities, including information concerning transportation, accommodations, attractions, adventures, tours, travel resources, equipment rental and medical resources.

American Academy of Family Physicians

P.O. Box 11210
Shawnee Mission, KS 66207-1210
800-274-2237
www.aafp.org

The American Academy of Family Physicians, founded in 1947, is one of the largest medical organizations in the United States. It strives to promote and maintain high standards for family doctors. The organization maintains a Web site for patients: www.familydoctor.org/. The site includes information on how to prevent stroke, on the warning signs of stroke and on rehabilitation. The information is also available in Spanish.

American Academy of Neurology

www.thebrainmatters.org

This Web site was developed by the American Academy of Neurology Foundation to help people better understand common disorders of the brain, including stroke, and to learn about those who are living with these disorders. The information is provided by neurologists and others with specialized training in diagnosing, treating and managing disorders of the brain and nervous system. Basic information about stroke (and other disorders) is presented in question-and-answer format. It includes links to the American Stroke Association, the American Occupational Therapy Association, the National Family Caregivers Association, the National Stroke Association, the National Aphasia Association and the National Institute of Neurological Disorders and Stroke.

American Heart Association

7272 Greenville Ave.
Dallas, TX 75231
800-242-8721
www.americanheart.org

The American Heart Association provides most of its stroke information through its American Stroke Association division. The AHA Web site, however, offers helpful information about healthy lifestyles, how to control high cholesterol, and a heart and stroke encyclopedia. The information is also available in Spanish.

American Stroke Association

7272 Greenville Ave.
Dallas, TX 75231-4596
888-4-STROKE [888-478-7653]
Fax 214-706-5231
www.strokeassociation.org

The American Stroke Association is a division of the American Heart Association. It provides education brochures, information sheets and videos. A limited number of free brochures and information sheets can be ordered by mail from the organization's Web site. You or your caregiver can call and ask for the Stroke Family Support Network; the network will put you in touch with someone who has had a stroke and is willing to discuss the experience. You also can obtain a free one-year subscription to the association's *Stroke Connection Magazine*.

Americans with Disabilities Act/U.S. Department of Justice

Civil Rights Division
Disability Rights Section
950 Pennsylvania Ave., N.W.
Washington, DC 20530
Information line 800-514-0301
800-514-0383 (TTY)
www.ada.gov

As its title implies, the federal Americans with Disabilities Act (ADA) prohibits discrimination against people who are disabled. The law applies to everyday activities (e.g., buying an item at the grocery store, joining a local gym, staying in a hotel or going to see a movie), to employment, to government services and to transportation. The ADA also mandates telephone relay services for people who use TTYs (teletypewriters, also known as TDDs or telecommunications devices for deaf persons). The U.S. Department of Justice maintains a Web site called the "ADA Home Page." The page features information on design standards, mediation and technical assistance. There also is information for businesses, nonprofit service providers, and state and local governments. A number of publications, including Guide to Disability Rights Laws, can be accessed from this site. And, there are links to other federal agencies that have ADA responsibilities (e.g., Equal Employment Opportunity Commission, Federal Communications Commission, etc.). General information, answers to specific technical questions or free ADA materials may be obtained by calling the agency's information line.

Brain Attack Coalition

www.stroke-site.org

The Brain Attack Coalition is group of professional, voluntary and government entities dedicated to reducing the occurrence, disability and death associated with stroke. The site includes stroke scales (e.g., Barthel index, Glasgow outcome scale, Hunt and Hess classification of subarachnoid stroke, etc.) used to evaluate patients; guidelines for establishing a diagnosis of stroke and determining its severity and treatment; and patient resources. The patient resources page contains links to the American Academy of Neurology, the American Association of Neurological Surgeons, the U.S. Centers for Disease Control and Prevention, the National Institute of Neurological Disorders and Stroke, and the University of Maryland Brain Attack Center.

Clinical Trials

www.clinicaltrials.gov

This service, which was developed by the National Library of Medicine, is provided by the National Institutes of Health. The site includes regularly updated information about privately and federally funded clinical research in human volunteers. You can search the database by disease/condition, sponsor, location, etc. Search results cover the clinical trial's purpose, who may participate, locations and contact information. It also includes links to other resources: MedlinePlus, NIH health information and genetic information.

Easter Seals

230 W. Monroe St., Suite 1800
Chicago, IL 60606-4802
312-726-6200 or 800-221-6827
Fax 312-726-1494
www.easter-seals.org

The Easter Seals organization can help you to become more independent through its educational programs and through its vocational training and employment, assistive technology and rehabilitation services. Easter Seals also offers child care for children (6 months to 5 years old), adult day care programs, and camping and recreation activities. This organization also can assist you and your caregiver in locating funding sources to help with needed medical equipment and bills.

ElderCare Locator
800-677-1116 (toll-free), Monday through Friday, 9 a.m. to 8 p.m. (Eastern time)
www.eldercare.gov

The U.S. Department of Health and Human Services, in partnership with the National Association of Area Agencies on Aging and the National Association of State Units on Aging, has operated this important resource since 1991. It connects older Americans and their caregivers with reliable information on programs and resources that will enable them to live independently and safely in their homes and communities as long as possible. The information, available in a number of languages (English, Chinese, Dutch, French, Italian, Japanese, Korean, Portuguese and Spanish), covers a variety of topics. You can search by city, state or ZIP code.

Great Lakes Regional Stroke Network
Center for Stroke Research
1645 W. Jackson Blvd., Suite 400
Chicago, IL 60612
312-355-5423
Fax 312-355-5444
E-mail hedworth@uic.edu
http://glrsn.uic.edu

The Great Lakes Regional Stroke Network was developed by state health department officials in Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin. These states have coordinated their cardiovascular and stroke programs. The network's goal is to increase awareness and to promote prevention and control activities within the region. The intended result of its efforts is to encourage collaboration and coordination in the Great Lakes states to reduce the burden of stroke.

Illinois CAPTURE Stroke Registry
Center for Stroke Research
1645 W. Jackson Blvd., Suite 400
Chicago, IL 60612
312-355-5421
Fax 312-355-5444
E-mail dpandey@uic.edu

Illinois is one of four states chosen to participate in the Paul Coverdell National Acute Stroke Registry. The Illinois registry, known as Illinois CAPTURE (CAre and Prevention Treatment Utilization REgistry) Stroke, has been organized through the collaborative efforts of the Illinois Department of Public Health (IDPH) and the University of Illinois at Chicago (UIC). It is being funded by the U.S. Centers for Disease Control and Prevention (CDC). In addition to the establishment of a stroke registry in Illinois, the program is partnering with the state's hospitals to improve the quality of care for stroke patients through quality improvement initiatives. A Web site is currently under construction.

Illinois Department of Healthcare and Family Services (formerly Illinois Department of Public Aid)
Division of Medical Programs
201 South Grand Ave., E.
Springfield, IL 62763
866-468-7543 – Health Benefits Hotline
877-204-1012 (TTY)
www.hfs.illinois.gov/programs

The Illinois Department of Healthcare and Family Services administers a variety of medical and prescription medicine programs. Information about these programs and about how to contact the agency can be found on the Web site. For information on where to apply for medical benefits, call 800-843-6154 or 800-447-6404 (TTY).

Illinois Department of Public Health

535 W. Jefferson St.
Springfield, IL 62761
217-782-3300 – Office of Health Promotion (Heart Disease and Stroke Prevention Program)
217-782-2913 – Office of Health Care Regulation
800-252-4343 – Nursing Home Hotline
www.idph.state.il.us

The Illinois Department of Public Health's Heart Disease and Stroke Prevention Program, in collaboration with its partner agencies and colleagues around the state, is making significant progress in helping people to address risk factors for heart attack and stroke. Prevention efforts promoting smoking cessation, increased physical activity and a more healthful diet, coupled with effective disease management, can help to reduce the incidence of heart attacks and strokes, to cut the number of deaths that occur as a result of these diseases, and to relieve some of the disability suffered by heart attack and stroke survivors. The Department's Office of Health Care Regulation regulates home health agencies and the state's long-term care facilities. The Web site contains a list of nursing homes in Illinois, along with a description of the types of nursing homes, a quarterly report of nursing home violators and a list of nursing homes with no deficiencies during their last survey. Also available is an informational booklet on how to select a nursing home. Complaints against health care facilities or agencies regulated by IDPH can be made by calling the Department's nursing home hotline.

Illinois Department on Aging

421 E. Capitol Ave., #100
Springfield, IL 62701
Senior Helpline 800-252-8966 or 217-785-3356
E-mail ilsenior@aging.state.il.us
Fax 217-785-4477
www.state.il.us/aging

The Illinois Department on Aging maintains a list of community services available to state residents 60 years of age and older. The agency can assist in connecting you and your caregiver with local agencies and organization such as the Senior Club. These groups can help you with prescription programs, homemaker services, transportation services, etc.

Internet Stroke Center

www.strokecenter.org

This Web site is a collaborative effort by Washington University School of Medicine (St. Louis, Mo.), the American Stroke Association and the National Institute of Neurological Disorders and Stroke. The site has separate sections for health care professionals and for the public. The public pages cover basic information about stroke, various education modules (e.g., pediatric stroke, adapting a home after stroke, etc.) and an extensive glossary of neurological terms. There are links to new and emerging news about stroke and a section that provides links to various listings of clinical trials. Some of the information on the site is available in Spanish.

Medicare

800-MEDICARE (800-633-4227)
www.Medicare.gov

The Medicare Web site provides a wide array of information about this federal health care coverage program. There is information on plan choices, prescription coverage and various preventive services (e.g., cardiovascular screening) that are covered. The site also offers a number of search tools. These options allow a person to compare home health agencies, hospitals and nursing homes. It also is possible to search for a doctor or a medical equipment supplier. A person can determine his/her Medicare eligibility and search for what type of coverage is available for a variety of health care services.

National Family Caregivers Association

10400 Connecticut Ave., Suite 500
Kensington, MD 20895-3944
301-942-6430 or 800-896-3650
Fax 301-942-2302
www.nfcacares.org

The National Family Caregivers Association educates, supports, empowers and provides public awareness and advocacy services to the public and to the nation's lawmakers. It recognizes the important contributions made by the family caregiver and emphasizes the cohesiveness of the caregiver and the stroke individual as the center of health care planning. As a caregiver, you can receive the informational newsletter "Take Care," which is published four times a year.

National Heart, Lung and Blood Institute

www.nhlbi.nih.gov

The National Heart, Lung and Blood Institute (NHLBI) provides leadership for a national program in diseases of the heart, blood vessels, lung and blood; blood resources; and sleep disorders. Since October 1997, the NHLBI also has administered the National Institutes of Health's Woman's Health Initiative. The institute plans, conducts, fosters and supports an integrated and coordinated program of basic research, clinical investigations and trials, observational studies, and demonstration and education projects. Research is related to the causes, prevention, diagnosis and treatment of heart, blood vessel, lung and blood diseases; and sleep disorders.

National Information Center of Children and Youth with Disabilities (NICHCY)

P.O. Box 1492
Washington, DC 20013
800-695-0285
Fax 202-884-8441
www.nichcy.org

The National Information Center of Children and Youth with Disabilities (NICHCY) is a resource for children and youth from birth to age 22 who have chronic illnesses and disabilities. The organization provides research-based information, education, public policy positions, and it assists children and young people and their families with issues concerning their transition to adulthood.

National Institutes of Health

9000 Rockville Pkwy.
Bethesda, MD 20892
301-496-4000
TTY 301-402-9612
www.nih.gov

The National Institutes of Health Web site contains an A-to-Z index of health resources, clinical trials, Medline Plus and health hotlines. It offers a gateway to the many individual institutes that comprise NIH.

National Institute of Neurological Disorders and Stroke

National Institutes of Health Neurological Institute
P.O. Box 5801
Bethesda, MD 20824
800-352-9424 or 301-496-5751
www.ninds.nih.gov

The National Institute of Neurological Disorders and Stroke (NINDS) provides a wealth of information on stroke. The information covers causes, prevention, diagnosis and treatment. This organization also supports, conducts, collects and distributes research information concerning stroke.

National Rehabilitation Information Center

4200 Forbes Blvd., Suite 202
Lanham, MD 20706-4829
800-346-2742 or 301-459-5900
Fax 301-459-4263
www.naric.com

The National Rehabilitation Information Center (NARIC) provides information on the different types of rehabilitation and on adaptive devices and aides to assist you along the road to recovery after your stroke. You also can get a free subscription for monthly alerts on current medical information and research concerning stroke.

National Stroke Association

9707 E. Easter Lane
Englewood, CO 80112-3747
303-649-9299 or 800-STROKES [800-787-6537]
Fax 303-649-1328
www.stroke.org

The National Stroke Association has launched a public education campaign – Ask Your Doctor – to stimulate greater dialogue between patient and physician. It is hoped that more discussion of the facts about stroke, including prevention, screening and treatment, will improve both the occurrence and outcome of stroke in the United States. The campaign's stroke recovery guide – "HOPE" – provides helpful information on such topics as organizations/resources, prevention, exercises and recommendations. The guide is available online. You can also go online and search for a support group near you. If you are a resident of the United States, you also can obtain a free subscription to the *Stroke Smart* magazine. This publication provides valuable information to people who have had a stroke and to their families and caregivers. The association can help you to keep up-to-date on the latest developments in medical technology and on breakthroughs in stroke-related products and services. Each issue features inspiring tales from actual people who have had a stroke and insightful advice from the nation's top stroke doctors.

Rehabilitation Institute of Chicago

Main Campus
345 E. Superior St.
Chicago, IL 60611
Referral and information line 800-354-REHAB (7342)
www.ric.org

Founded in 1954, the Rehabilitation Institute of Chicago (RIC) has been consistently rated as the best hospital of its kind in the United States. Operating out of more than 30 locations around the state, RIC offers inpatient, outpatient and day rehabilitation for a variety of conditions and diseases, including stroke. RIC is associated with Northwestern University's Feinberg School of Medicine.

U.S. Centers for Disease Control and Prevention

1600 Clifton Road
Atlanta, GA 30333
404-639-3534
800-311-3435
www.cdc.gov

This Web site contains data and statistics related to various diseases. It also features information about a number of health and safety topics, among them stroke.

University of Medicine and Dentistry of New Jersey

Stroke Center at University Hospital
90 Bergen St., Suite 8100
Newark, NJ 07101
973-972-2550
www.theuniversityhospital.com/stroke/

The University Hospital is the principal teaching hospital of the New Jersey medical school. Web pages for the hospital's stroke center cover prevention, diagnosis, treatment and rehabilitation. The site also contains interesting statistics and facts about stroke.

Women's Health Initiative

www.whi.org

The Women's Health Initiative (WHI) is a long-term national health study that focuses on strategies for preventing heart disease, stroke, breast and colorectal cancer, and fracture in postmenopausal women. This 15-year project involves more than 161,000 women between the ages of 50 and 79, and is one of the most definitive, far-reaching programs of research on women's health ever undertaken in the United States. This Web site provides WHI participants and others interested in WHI findings a way of obtaining information about research results directly from the study rather than through news reports.

Pre- and Post-test Answer Key

Following are the correct answers to the pre- and post-tests included in this information and resource guide. How well did you do?

1. Stroke is a leading cause of long-term disability among adults in the United States.

True. Stroke is a leading cause of long-term disability among American adults. A stroke clearly affects the brain but its effects appear in other parts of the body, too. A stroke survivor may experience paralysis, cognitive, emotional and speech problems, pain and difficulties with daily living. Many of these problems will respond to therapy and to post-stroke rehabilitation programs. Others will be permanent and will require specialized care at home or in a long-term care facility.

2. More men have strokes but more women die as the result of a stroke.

True. Gender plays a role in stroke risk. Men have a higher risk of stroke but more women die from stroke. Part of this is due to the fact that, because men usually are younger when they have a stroke, they have a higher rate of survival. Because women are usually older when they have a stroke, they are more likely to have other health problems that complicate recovery. In Illinois, where stroke is the third leading cause of death, 4,082 women died in 2004 as the result of a brain attack; during the same time, 2,395 men died due to stroke.

3. Warning signs of a brain attack or stroke include –

All of the above. There are five important warning signs to let you and those around you know you may be having a brain attack or stroke. All of these warning signs appear suddenly:

- Numbness or weakness of the face, arm or leg, especially on one side of the body
- Confusion, trouble speaking or understanding
- Trouble seeing in one or both eyes
- Trouble walking, dizziness, loss of balance or coordination
- Severe headache with no known cause

If any of these warning signs occur to you or someone near you, they constitute a medical emergency. Do not wait; call 911 immediately. The quicker someone suffering a stroke receives appropriate medical care, the better the odds of a full recovery. Remember, every minute counts!

4. Warning signs of a brain attack or stroke usually happen over a few hours.

False. Warning signs of a stroke happen suddenly.

5. If you are exhibiting any of the warning signs of a stroke, it is a true emergency; you or someone near you must call 911 immediately!

True. Response to a stroke should be rapid. Do not wait for the symptoms to simply go away.

6. For the most effective treatment of stroke, a person has four hours from the time symptoms/warning signs start to seek emergency treatment at the local hospital.

False. Someone suspected of having a stroke should seek immediate medical care. Remember, every minute counts! In fact, some of the most effective treatments for stroke cannot be administered after an initial three-hour window. However, in the United States, the average time between when symptoms appear and when a person arrives at the hospital for treatment is around 22 hours.

7. Which of the following are risk factors can make a person more prone to having a brain attack or stroke?

A, b and c. High blood pressure, diabetes and heart disease cause problems with a person's vascular system that can increase the risk of stroke. If a person has any of these diseases, he/she should work closely with a physician to manage them appropriately. Lifestyle choices also can increase a person's risk of stroke. Smoking cigarettes, being overweight and leading a sedentary lifestyle all can contribute to a greater chance of having a brain attack. If a person has ever had a transient ischemic attack (TIA), he/she is more likely to suffer a stroke. In fact, of the approximately 50,000 people who have TIAs each year in the United States, about one-third will have a serious stroke in the future.

8. One way to prevent a brain attack or stroke is to raise your "good cholesterol" levels. To do this, stop smoking, lose excess weight and exercise more.

True. HDL carries about one-fourth to one-third of blood cholesterol. It is believed that HDL carries cholesterol away from the arteries and back to the liver, where it is passed from the body. Some medical experts contend that HDL removes excess cholesterol from plaques and thus slows their growth. High levels of this "good" cholesterol seem to protect against heart attack. Low levels (less than 40 mg/dL in men; less than 50 mg/dL in women), on the other hand, can indicate a greater risk of heart disease and stroke. The best way to improve cholesterol levels is to stop smoking, shed excess weight and exercise more.

9. "Assistive devices" help people with disabilities live more independently and safely. One example of an assistive device is a walker.

True. Many stroke survivors will require these kinds of assistive devices to help them to compensate for the problems and disabilities caused by their brain attacks. During post-stroke rehabilitation, physical and occupational therapists will help the stroke survivor learn how to use these devices to increase his/her independence.

10. A caregiver is a nursing staff member at a hospital.

False. A caregiver is anyone who assists the stroke survivor during and after the recovery process. In many cases, the caregiver is a spouse or other member of the stroke survivor's family.

Insurance and Payment Information

As is the case with any serious illness or injury, a stroke survivor may have several resources on which to draw to pay for the health care services involved in the treatment and recovery phases. Generally, these are private health insurance, government health programs (e.g., Medicare and Medicaid) and personal resources (e.g., savings). Be sure the patient or his/her family has a phone number and a contact person for each type of insurance. Following are some questions to be asked after a person has had a stroke.

Primary insurance

Phone number _____

Contact person _____

Secondary insurance

Phone number _____

Contact person _____

General questions

1. Do these insurances work together? How?
2. Is the primary insurance a traditional policy? An HMO (health management organization)? A PPO (preferred provider organization)? Medicare? Medicaid? What benefits are available?
3. Is there a deductible that must be met before benefits kick in?
   Is there a separate deductible for inpatient care/services? How much is it? Has it been met?
   Is there a separate deductible for outpatient care/services? How much is it? Has it been met?
4. In the case of an HMO or a PPO, are out-of-network benefits available? How does the out-of-network benefit work?
   If out-of-network coverage is not available, is there any recourse if such services are needed?

Inpatient rehabilitation

1. Is there coverage for inpatient rehabilitation?
2. If yes, are only certain diagnoses covered?
3. Is there a limit on the number of days spent in inpatient rehabilitation?
4. Can the stroke survivor attend inpatient rehabilitation at any facility or only at certain “participating” facilities?
5. If only at certain facilities, which ones?
6. Is there out-of-network coverage?
7. If yes, how does the out-of-network benefit work?

Outpatient rehabilitation

Physical therapy

1. Is there coverage for outpatient physical therapy?
2. If yes, are only certain diagnoses covered?
3. Does the stroke survivor need a referral from his/her primary doctor?
4. Is there a limit on the number of days or visits? Is it per calendar year or per rolling (fiscal) year?
5. Is there a co-payment? If yes, how much? Is it per visit? Per session? Per month?
6. Can the stroke survivor attend physical therapy anywhere or only at certain facilities?

Occupational therapy

1. Is there coverage for outpatient occupational therapy?
2. If yes, are only certain diagnoses covered?
3. Does the stroke survivor need a referral from his/her primary doctor?
4. Is there a limit on the number of days or visits? Is it per calendar year or per rolling (fiscal) year?
5. Is there a co-payment? If yes, how much? Is it per visit? Per session? Per month?
6. Can the stroke survivor attend occupational therapy anywhere or only at certain facilities?

Speech therapy

1. Is there coverage for outpatient speech therapy?
2. If yes, are only certain diagnoses covered?
3. Does the stroke survivor need a referral from his/her primary doctor?
4. Is there a limit on the number of days or visits? Is it per calendar year or per rolling (fiscal) year?
5. Is there a co-payment? If yes, how much? Is it per visit? Per session? Per month?
6. Can the stroke survivor attend speech therapy anywhere or only at certain facilities?

Medications

1. Are medications covered? How?
2. What are the rules about generic medications?

Miscellaneous

1. Are any disease management programs covered?

The following document was developed by the American Heart Association/American Stroke Association as a guide for stroke survivors and their caregivers in evaluating rehabilitative services in skilled nursing facilities. It also lists a number of competencies one should expect in those providing these services. Finally, it includes quality indicators for stroke rehabilitation facilities.

Stroke Rehabilitation in Skilled Nursing Facilities

A Guide for Patients, Caregivers and Healthcare Professionals

Table of Contents

The American Stroke Association thanks the following individuals for their contributions to this guide:
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Marnee Shepard, PT, NCS
Fred Waterous, Stroke Survivor
Members of the Minneapolis/St. Paul American Stroke Association Staff

Every specialty of medicine has its own standards of care. Caring for a stroke patient requires specialized standards of care. The following pages include information that the medical professional, stroke patient and family should incorporate to meet the needs of the stroke survivor.

Section 1 - Questions about Rehabilitation Programs in Skilled Nursing Facilities

You are entitled to a coordinated rehabilitation program designed and provided by dedicated stroke rehabilitation professionals. These individuals have expertise in medicine, nursing, physical therapy, occupational therapy, speech therapy, recreational therapy, nutrition, pastoral care, social work, psychology and patient education. These specialists function as a coordinated team to expedite your best recovery.

The following questions should be asked to assess the quality of a rehabilitation program and facility. The more favorable the answers, the greater the likelihood of your best recovery.

I. Team

A. Is there a team of rehabilitation specialists (including a nurse, physical therapist, occupational therapist and speech therapist) providing the stroke care?
B. Are therapies provided six times per week, at least once a day?
C. What is the average patient load for each specialist?
D. Does the team meet regularly to update the family and patient on the progress?
E. Does a doctor lead the team and provide weekly visits?
F. Does the doctor have experience in rehabilitation?

II. Results

A. What percentage of stroke patients recover enough to go home?
B. What is the length of stay of a patient who returns home?
C. How does the facility help ensure that Medicare or the insurance program will cover the services provided?

III. Environment

A. Is there a designated unit for rehabilitation?
B. Are all facilities on the unit wheelchair accessible, including the bathroom?
C. Is there a separate area for dining?
D. Is there a TV and phone in each room?

Section 2 - Checklist for Choosing a Skilled Nursing Facility for Stroke Rehabilitation

Use the checklists on the following pages for comparisons when choosing a skilled nursing facility. Please make copies if reviewing additional facilities.

Facility #1

Name _____

Location _____

Contact Person _____

Phone (_____)_____

Questions to ask the team	Answer
• Does a team of rehabilitation specialists provide stroke care?	_____
• Are therapies provided six times a week, at least once a day?	_____
• Does the team meet regularly to update family and patient on progress?	_____
• Does a doctor lead the team and provide weekly visits?	_____
• Does the doctor have experience in rehabilitation?	_____

Questions to ask on results	Answer
• Do you track the percentage of patients who go home versus those who go to long term care facilities?	_____
• Do at least 70% of stroke rehabilitation patients go back home?	_____

Questions to ask on environment	Answer
• Is there a designated unit for rehabilitation?	_____
• Are all unit facilities wheelchair accessible, including the bathroom?	_____
• Is there a separate area for dining?	_____
• Is there a TV and phone in each room?	_____

Notes: _____

_____

_____

_____

_____

Facility #2

Name _____

Location _____

Contact Person _____

Phone (_____)_____

Questions to ask the team	Answer
• Does a team of rehabilitation specialists provide stroke care?	_____
• Are therapies provided six times a week, at least once a day?	_____
• Does the team meet regularly to update family and patient on progress?	_____
• Does a doctor lead the team and provide weekly visits?	_____
• Does the doctor have experience in rehabilitation?	_____

Questions to ask on results	Answer
• Do you track the percentage of patients who go home versus those who go to long term care facilities?	_____
• Do at least 70% of stroke rehabilitation patients go back home?	_____

Questions to ask on environment	Answer
• Is there a designated unit for rehabilitation?	_____
• Are all unit facilities wheelchair accessible, including the bathroom?	_____
• Is there a separate area for dining?	_____
• Is there a TV and phone in each room?	_____

Notes: _____

_____

_____

_____

_____

_____

_____

_____

_____

Section 3 - American Stroke Association Recommended Staff Competencies for Stroke Rehabilitation Providers
These skills and areas of expertise are necessary for stroke rehabilitation providers.

I. Broad Mandated Requirements

A. Maintains current licensure in state of practice
B. Maintains proper continuing medical education for field

II. Broad Stroke-Related Knowledge and Skills Necessary for All Disciplines (at least one person from each discipline participates in ongoing education, with an emphasis on stroke)

A. Recognizes value in, understands fully and participates in an interdisciplinary rehabilitation process
B. Demonstrates appropriate experience and training to provide proper rehabilitation services
C. Advocates for people with stroke originated disabilities
D. Communicates effectively with patient, family, rehabilitation team and all other stakeholders (hospital, referring physicians, rehabilitation units of various acuity, insurance carriers, etc.) and has the responsibility to serve as case manager for the coordination of care
E. Is aware of and has access to resources for survivors and family members
F. Is aware of and has access to stroke support group resources in the community
G. Recognizes potential stroke deficits and understands the mechanism of stroke, magnitude of injury and impact of deficit upon the patient
H. Demonstrates ability to provide patient and family education
I. Is aware of contemporary research trends in stroke rehabilitation literature
J. Has relationships with other healthcare professionals who are available to make referrals

III. Discipline-Specific Qualifications

A. Physician
1. Recognizes prognosis for recovery, duration and style of rehabilitation best suited to restore stroke patients to highest level of independence
2. Demonstrates appropriate experience and training to provide rehabilitation physician services, including but not limited to, patient evaluation, management, stroke education, stroke research and community integration
3. Ensures rehabilitation process adherence to policies and ethical conduct
4. Ensures adequacy of all other rehabilitation disciplines
5. Participates in decision-making during the rehabilitation process
6. Understands delivery of rehabilitation services through entire continuum of care for stroke (acute, sub-acute, skilled nursing facility, home care and outpatient)
7. Provides evaluation and medical management of the disease process

B. Nursing
1. Completes assessments, develops care plan, provides intervention and treatments for stroke-related impairments including but not limited to:
    - Physical mobility
    - Self-care deficits
    - Sensory perceptual alteration
    - Verbal communication
    - Bowel/bladder function
    - Potential for injury
    - Home maintenance management
    - Hydration and nutrition
    - Fatigue
2. Assesses and refers to appropriate specialists related to impairments in:
    - Neglect
    - Thought process and cognition
    - Body image
    - Depression
    - Sexuality
    - Skin integrity
    - Caregiver coping abilities
    - Spirituality
    - Home management
3. Demonstrates accountability to ensure that the concepts learned in therapy are applied to functional daily activities
4. Assesses for medical complications after stroke and communicates with physician

C. Speech-Language Pathologist

Completes assessments, develops care plan, provides intervention and treatments for stroke-related impairments including but not limited to:

- Swallowing and aspiration risk
- Motor speech abilities including differential diagnosis of dysarthria types and apraxia
- Receptive and expressive language abilities including auditory/ reading comprehension and verbal/written expression
- Visual neglect related to reading, writing, problem solving and learning processes
- Impaired thought processes including memory, organization, problem solving and abstract reasoning
- Augmentative communication including low/high technical capabilities

D. Occupational Therapist

Completes assessments, develops care plan, provides intervention and treatments for stroke-related impairments including but not limited to:

- Spasticity
- Motor behavior after stroke
- Neglect and disturbance in body image
- Vision and visual field deficits
- Cognitive impairments
- Self care, leisure and home management
- Safety concerns

E. Physical Therapist

Completes assessments, develops care plan, provides intervention and treatments for stroke-related impairments including but not limited to:

- Assistive and adaptive devices
- Gait, locomotion and balance
- Motor control and motor learning
- Orthotic, protective and supportive devices
- Self-care and home management
- Neuromuscular performance and sensory integration

F. Social Services

Completes assessments, develops care plan and provides information to the patient, family and team regarding:

- Caregiver coping abilities and support
- Previous living situation and potential post-discharge environments
- Psychosocial history including chemical use and mental health issues
- Patient's goals for discharge
- Financial resources including insurance
- Community resources to facilitate the discharge plan

G. Nutrition

Completes assessments, develops care plan, provides intervention and treatments for stroke-related impairments including but not limited to:

- Difficulty swallowing (dysphagia)
- Difficulty feeding self
- Difficulty meeting energy, protein and fluid needs
- Long-term disease management related to nutrition (via diet education)

Section 4 - Quality Indicators for Stroke Rehabilitation Facilities

The following is a broad overview of standards for rehabilitation providers and discharge planners to evaluate facilities that provide stroke rehabilitation. The questions are intended as guidelines for program self-assessment, as well as a means of comparing facilities that provide stroke rehabilitation in skilled nursing facilities.

I. Outcome Measures

A. Do you use a stroke functional outcome measurement tool? Which one?
B. What is the percentage of discharge to home? What is the average length of stay in the hospital?
C. What percentage of people in subacute hospitals recover sufficiently to return to an acute rehabilitation hospital?
D. What percentage of in-hospital patients develop medical complications requiring readmission to an acute hospital setting?
E. What percentage are discharged to long-term skilled nursing facilities (SNF)?
F. Do you set outcome goals? Do you track the progress in achieving these goals?
G. How many hours of continuing education related to treating stroke patients have members of your interdisciplinary team taken in the past two years?

II. Service Standards

A. Medical Direction
1. Do you have a physician who directs the rehabilitation of your patients?
2. Is your designated physician experienced in rehabilitation?
3. Does the physician make rounds on each stroke patient at least once weekly? If not, how frequently?
4. Does the physician direct the medical treatment of the stroke patient's medical- and stroke related complications?
5. Does the physician establish a prognosis and update rehabilitation progress on a weekly basis at the team conferences?
6. Does the physician serve as a resource for the rest of the stake-holders (stroke patient, family, rehabilitation team specialists, rehabilitation facility and insurance carrier)? Does he/she assume the leadership role in the long- and short-term rehabilitation management of each stroke patient?

B. Nursing
1. What is your ratio of registered nurses to patients? Of licensed practical nurses to patients? Of nursing assistants to patients?
2. Do you have care plans that include daily rehabilitation interventions?
3. Do you have a self-medication program?
4. Does nursing develop and implement a bowel and bladder plan for each patient?
5. Does nursing develop and implement a skin integrity program?
6. Do your nurses participate in weekly team conferences?

C. Physical Therapy
1. What is the ratio of physical therapists to physical therapy assistants on your team?
2. Do therapy aides assist in delivering care?
3. Do you have a physical therapist who is a Board Certified Neurological Clinical Specialist?
4. How many of your physical therapists are trained in Neuro-developmental Treatment (NDT). Have they taken and passed the 3-week hemiplegia course?
5. When ordering an orthotic for a patient, do the orthotist, therapist and patient meet together prior to fabrication?
6. Are you equipped to administer neuromuscular electrical stimulation?
7. Do your therapists supervise the customization of wheelchairs for your patients?
8. Do your physical therapists participate in weekly team conferences?

D. Occupational Therapy
1. Is there evidence that occupational therapy assessments are completed by occupational therapists (rather than occupational therapy assistants)?
2. Do you have an occupational therapist who is Board Certified in Neuro-rehabilitation?
3. How many occupational therapists do you have who are NDT trained (have taken and passed the 3-week hemiplegia course)?
4. Do occupational therapy assessments and treatment plans address the following?
   - Spasticity
   - Motor behavior after stroke
   - Neglect
   - Vision and visual field deficits (including acuity, extraocular muscle control, binocular vision, tracking/scanning and confrontation testing)
   - Cognitive impairments (including attention, memory and problem solving)
   - Self care, leisure and home management
5. Do your occupational therapists participate in weekly team conferences?

E. Speech Language Therapy
   1. Are all speech language pathology services provided by masters degree level speech language pathologists (SLPs) with American Speech and Hearing Association (ASHA) accreditation?
   2. Is once-a-day therapy by a speech language pathologist available?
   3. Are diet recommendations based on clinical exams or modified barium swallow studies?
   4. Does an SLP perform cognitive-linguistic treatment?
   5. Do your SLPs have access to augmentative communication equipment?
   6. Are your SLPs contracted or employees of your facility?
   7. Do your SLPs participate in weekly team conferences?

III. Facility Standards

A. Does your facility have a short-term rehabilitation unit separate from long-term care?
B. Does your facility have staff dedicated to the short-term unit?
C. Does your short-term rehabilitation unit have a program manager?
D. Does every short-term rehabilitation unit room have a television and telephone?
E. Does your facility participate in weekly team conferences?
F. If contract services are utilized, how do you ensure continuity of care?

It is our hope that the information in Sections 1 and 2 will help family members and the stroke survivor select a facility that will provide the best option for rehabilitative care.

We also hope that Sections 3 and 4 will help to enhance the level of care provided for stroke patients.

These standards are approved by the American Stroke Association, a division of the American Heart Association.

Why should I know my numbers?

Your risk for stroke and heart disease can be assessed by knowing your numbers for body composition, cholesterol, triglycerides, blood pressure and blood sugar, and by understanding what they mean.

Body composition

Your body is made up of water, fat, protein, carbohydrates, and various vitamins and minerals.
If you have too much fat – especially in your waist area – your risk for stroke and heart disease is higher.

Body mass index

Body mass index (BMI)* assesses a person's weight relative to height. BMI is commonly used to classify weight as "healthy" or "unhealthy."

BME = 703 X body weight (in pounds) ÷ height (in inches) X height (in inches)

For example, a person who weighs 150 pounds and is 5' 2" tall would have a BMI of 27.4:
703 X 150 = 105,450 ÷ 3,844 (62 X 62) = 27.4.

BMI less than 18.5	underweight
BMI 18.5-24.9	healthy
BMI 25-29	overweight
BMI 30 +	obese

Waist circumference

The waist circumference is a simple measurement around a person's natural waist (just above the navel).
A high-risk waistline is defined as more than 35 inches (88 cm) for women and more than 40 inches (102 cm) for men.

*BMI may not be the most appropriate indicator to determine health status for certain groups of people.
Your doctor will determine if this is the correct method to use.

Cholesterol

Cholesterol is a waxy substance found in all parts of your body. It is coated with a layer of protein – creating a "lipoprotein" – so it can travel through the blood. There are two types of cholesterol:

- **LDL (low-density lipoprotein)** carries most of the cholesterol in the blood. When there is too much in the blood, it can lead to a cholesterol buildup in the arteries. This is why it is called the "bad" cholesterol.
- **HDL (high-density lipoprotein)** helps to remove cholesterol from the blood and helps to prevent the fatty buildup. HDL is called the "good" cholesterol.

Total cholesterol level

Less than 200 mg/dL	desirable
200 mg/dL-239 mg/dL	borderline high
240 mg/dL +	high

LDL cholesterol level

Less than 100 mg/dL	optimal
100 mg/dL-129 mg/dL	near/above optimal
130 mg/dL-159 mg/dL	borderline high
160 mg/dL-189 mg/dL	high
190 mg/dL +	very high

Triglycerides

Triglycerides are the chemical form in which most fat exists in food as well as in the body. They are also present in blood plasma and, in association with cholesterol, form the plasma lipids.

Triglycerides in plasma are derived from fats eaten in foods or made in the body from other energy sources, such as carbohydrates. Calories ingested in a meal and not used immediately by body tissues are converted to triglycerides and transported to fat cells to be stored.

Excess triglycerides in plasma are called hypertriglyceridemia. It is linked to the occurrence of coronary artery disease in some people. Elevated triglycerides may be a consequence of other diseases, such as untreated diabetes. As with cholesterol, increases in triglyceride levels can be detected by plasma measurements. These measurements should be made after an overnight food and alcohol fast.

Triglyceride level

Less than 150 mg/dL	normal
150 mg/dL-199 mg/dL	borderline high
200 mg/dL-499 mg/dL	high
500 mg/dL +	very high

Blood pressure

Blood pressure is the force of blood as it moves through the blood vessels. If blood cannot flow easily through the vessels, the force increases. If the force becomes too great, you have high blood pressure, or hypertension.

The higher (systolic) number represents the pressure while the heart is beating. The lower (diastolic) number represents the pressure when the heart is resting between beats. The systolic pressure is always stated first and the diastolic pressure second.

Blood pressure level

Category	**Blood pressure level (mm Hg)**	
	Systolic	Diastolic
Normal	< 120	< 80
Prehypertension	120-139	80-89
Stage 1 hypertension	140-159	90-99
Stage 2 hypertension	160 +	100 +

< = less than

NOTE: These categories apply to people 18 years of age and older. They are from the "Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure" (JNC7).

Blood sugar

Diabetes is a metabolic disorder in which the level of glucose in the blood – called blood sugar – is too high. Normally, the body gets its energy from blood sugar, which comes from food.

According to the American Diabetes Association, a fasting blood sugar level in people who do not have diabetes should be 60 mg/dL-99 mg/dL. If you have diabetes, your goal for blood sugar levels using a blood glucose meter should be as follows.

Blood sugar level

Time of day	Old monitor (does not check plasma glucose levels)	New monitor (does check plasma glucose levels)
Before meals	80 mg/dL-120 mg/dL	90 mg/dL-130 mg/dL
At bedtime	100 mg/dL-140 mg/dL	110 mg/dL-150 mg/dL

Your blood sugar goals may be different from these ideal goals. Ask your health care provider what goals are best for you.

Know Your Numbers

Here's a summary of what your ideal numbers should be. Try to live by them!

Body composition	
BMI	Less than 25
Waist circumference	Less than 40 inches for men
	Less than 35 inches for women
Total cholesterol	Less than 200 mg/dL
LDL cholesterol	Less than 130 mg/dL
HDL cholesterol	More than 40 mg/dL
Triglycerides	Less than 150 mg/dL
Blood pressure	Less than 120/80
Blood sugar	60 mg/dL-99 mg/dL

A

Aneurysm
A cerebral aneurysm occurs when a weak spot is present in the wall of a vein or artery in the brain bulges. Aneurysms can happen to anyone at any age but are more common in adults than in children. Slightly more women than men suffer from cerebral aneurysms. An unruptured aneurysm, depending on its size and rate of growth, may produce no symptoms. If the aneurysm is large and growing, a person may experience loss of feeling in the face or vision problems. Prior to the rupture of an aneurysm, a person may suffer a sudden and severe headache, nausea, vision impairment, vomiting and loss of consciousness.

Emergency medical treatment is critical to restore deteriorating respiration and to reduce intracranial pressure. To prevent further bleeding, surgery is usually performed within three days to clip the ruptured aneurysm. If an aneurysm is found prior to rupturing, there are medical procedures that can prevent this. A patient's prognosis depends on where the aneurysm was located, how much damage was done, and on the patient's age, general health and neurological condition.

Anteriovenous malformations
These circulatory system defects are thought to arise during fetal development or shortly after birth. Experts estimate that approximately 300,000 people in the United States may have AVMs. These malformations may develop in many different sites, but those in the brain and/or spinal cord are of most concern. Even then, the majority of people with neurological AVMs will experience few significant symptoms. Seizures and headaches are the most common symptoms. However, a small percentage (about 12 percent) will suffer neurological symptoms that may be severe. But, depending on the location of the AVM, symptoms could include muscle weakness, loss of coordination, dizziness, visual disturbances, and varying degrees of mental confusion. The greatest danger posed by AVMs is hemorrhage. While some bleeding episodes are small and may never be detected, others can cause severe neurological damage.

Relatively minor symptoms often are treated with medication. If symptoms are severe, surgery or radiation therapy may be needed. The surgery is risky, though, and decisions to operate are made on a case-by-case basis. If an AVM is detected, a person should be closely monitored for any signs that would indicate a potential hemorrhage.

Anticoagulants
These drugs prevent the formation of blood clots.

Antiplatelet agents
An accumulation of platelets, a type of blood cell, can form a blood clot. These drugs prevent such accumulations. A common antiplatelet agent is aspirin.

Antithrombotics
These drugs prevent blood clots by inhibiting the coagulating actions of thrombin, a blood protein. Warfarin and heparin are antithrombotics.

Aphasia
This neurological disorder, which is estimated to affect nearly 1 million people in the United States, occurs when the portions of the brain responsible for language are damaged. Major signs are difficulty in verbally expressing oneself and in understanding speech and problems with reading and writing. Most commonly seen in adults following a stroke, aphasia – which is not a disease but a symptom of brain damage – also can result from a brain tumor, head injury or dementia. How much difficulty a person will have depends on where in the brain the damage occurred and how much brain tissue was affected.

Aphasia can be divided into four general categories:
- Expressive aphasia is characterized by problems communicating through speech or writing.
- Receptive aphasia occurs when a patient cannot understand the words he/she is hearing or seeing in print.
- Amnesia (anomic) aphasia is the least severe form of the disorder and is characterized by the inability to choose the correct name for people, places or things.
- Global aphasia if the most severe form of the disorder; patients lose nearly all language function (comprehension and expression).

Complete recovery is possible, in some cases without treatment. However, most patients should begin language therapy as soon as possible. A speech therapist can help to tailor an individual rehabilitation plan for the aphasia patient that will include extensive and repetitive reading and writing exercises. The younger the patient and the less extensive the brain damage, the better the prognosis will be. Generally, though, patients tend to regain language comprehension skills more completely than those involving expression.

Arteriography
This examination of the carotid arteries uses X-rays and a special dye that is injected into the arteries.

Atherosclerosis
This blood vessel disease occurs when deposits of lipid material accumulate on the walls of large to medium-sized arteries. Eventually, the deposits will thicken the artery walls, making them hard, brittle and prone to breaking.

Atrial fibrillation
This irregular beating of the left atrium (upper left chamber of the heart) can result in the formation of clots that may break lose and travel to the brain where they can cause a stroke.

C

Carotid artery disease
The carotid arteries, located on either side of the neck, supply the brain with blood. Carotid artery disease occurs when fatty deposits in these arteries begin to restrict blood flow to the brain. If the arteries become so clogged that blood flow is completely cut off or if a blood clot forms in the arteries, a stroke may result.

Carotid endarterectomy
This surgical procedure removes the fatty deposits in the carotid arteries, restoring adequate blood flow to the brain.

Central pain syndrome
Also known as central stroke pain, CPS is caused by damage to an area in the thalamus. The pain is a mixture of sensations: heat, cold, burning, tingling, numbness, and sharp stabbing and underlying aching.

Cerebrovascular disease
This condition occurs when the supply of blood to the brain is reduced because plaque buildup has narrowed the arteries (stenosis) or is blocked completely by a blood clot.

Cholesterol
This waxy substance is produced naturally by the liver and is ingested in some foods, particularly those high in saturated fat. Cholesterol circulates in the blood and helps to maintain tissues and cell membranes. Excessive levels of cholesterol can lead to atherosclerosis and high blood pressure.

Clipping
This surgical procedure is used to treat brain aneurysms. It involves clamping an aneurysm from a blood vessel, surgically removing the ballooned part of the vessel, and closing the opening in the artery wall.

Computerized tomography (CT) scan
This procedure creates a series of cross-sectional X-rays of the brain and head. It is one of the imaging methods used to diagnose the location and severity of a stroke.

D

Diabetes
This disease affects the body's ability to produce and/or use insulin, a hormone that allows cells to absorb glucose, the body's main source of fuel. If too little (or no) insulin is produced, glucose builds up in the blood and can reach dangerous levels. Diabetes can seriously harm blood vessels throughout the body, including those in the brain, which increases the risks of stroke. High blood glucose levels cause hardening of the arteries (atherosclerosis), thicken capillary walls and make blood stickier — all significant risk factors for ischemic stroke.

Diseases of the heart
Diseases of the heart are the No. 1 cause of death in the United States. This broad category includes many types of heart and blood vessel diseases. Atherosclerosis, atrial fibrillation and hypertension are some examples. All are risk factors for both heart attacks and strokes. Many diseases of the heart can be controlled through lifestyle modification, medication and other kinds of medical intervention.

Glossary

Duplex Doppler ultrasound
During this diagnostic imaging procedure, sound waves are bounced off the blood as it moves through an artery. Frequency changes in the sound waves can be measured and used to indicate the amount of blockage present in the artery.

Dysarthria
This disorder, common following a stroke, is characterized by slurred speech due to weakness or lack of coordination in the muscles used to speak.

Dysphagia
Another common problem following a stroke, this disorder makes it difficult for a person to swallow.

E

Embolic stroke
This kind of stroke is caused by an embolus – a free-roaming clot – that usually forms in the heart. Atrial fibrillation is one condition that can cause blood clots to form in the heart.

H

Hemiparesis
Another common problem following stroke, hemiparesis is weakness on one side of the body.

Hemiplegia
This diagnosis indicates complete paralysis on one side of the body.

Hemorrhagic stroke
This type of stroke is characterized by sudden bleeding into or around the brain.

High-density lipoproteins
High-density lipoprotein, or HDL, is good cholesterol. Composed of a lipid (fat) and a protein, HDL helps to remove excess cholesterol from the bloodstream and carries it to the liver where it is excreted. HDL prevents the accumulation of cholesterol and other fats along artery walls. HDL levels should be above 40 mg/dL.

Hypertension
Blood pressure is a measurement of the force of blood as it moves through the blood vessels. If blood cannot flow easily through the vessels (e.g., due to the buildup of plaque), the force increases. If it gets too high, a person has hypertension. Ideal blood pressure is less than 120/80. The higher (systolic) number represents the pressure while the heart is beating. The lower (diastolic) number represents the pressure when the heart is resting between beats.

I

Intracerebral hemorrhage
This condition occurs when a blood vessel within the brain leaks blood into the brain.

Ischemic stroke
This type of stroke occurs when blood flow to the brain is disrupted either by stenosis, the narrowing of an artery due to the buildup of plaque, or a blood clot. Nearly 80 percent of all strokes are this type.

L

Lipoproteins
These are small globules of cholesterol covered by a layer of protein. They are produced by the liver.

Low-density lipoproteins
Low-density lipoproteins (LDL) are the bad form of cholesterol. LDLs carry the majority of total cholesterol in the blood. They deposit excess cholesterol along the inside of arterial walls. The optimal level for LDL is less than 100 mg/dL.

M

Magnetic resonance angiography
Magnetic resonance angiograph, or MRA, is a technique that uses magnetic fields and contrast dye to create an image of blood flowing through a vessel. It often is used to detect stenosis (narrowing) in the brain arteries.

Magnetic resonance imaging
Commonly referred to as an MRI, this diagnostic procedure uses magnetic fields to detect subtle changes in the water content of tissues.

P

Plaque
These fatty cholesterol deposits on artery walls lead to atherosclerosis and stenosis of the arteries.

Platelets
A component of blood, these structures are known primarily for their role in blood coagulation.

R

Recombinant tissue plasminogen activator
This is a genetically engineered form of t-PA, a thrombolytic, anti-clotting substance made naturally be the body. The drug has proven to be very effective in reversing the effects of a stroke but it must be administered within the first three hours following the onset of symptoms.

S

Stenosis
This narrowing of an artery occurs when plaque builds up on the wall of the artery.

Subarachnoid hemorrhage
Marked by bleeding within the meninges, or outer membranes, of the brain into the cerebrospinal fluid that surrounds the brain, this type of hemorrhagic stroke is the most deadly. Although it accounts for only 7 percent of all strokes, subarachnoid hemorrhage is fatal in more than half the cases. Of those who survive, approximately half will suffer permanent disabilities.

T

Thrombolytics
These drugs are used to treat an ongoing, acute ischemic stroke by dissolving the blood clot that is causing the stroke and restoring blood flow to the brain.

Thrombosis
This is a formation of blood clot in one of the cerebral arteries of the head or neck that stays attached to the artery wall until it grows large enough to block blood flow.

Total serum cholesterol
This is a combination of a person's high-density lipoprotein (HDL) and low-density lipoprotein (LDL). It is desirable that a person's total cholesterol be less than 200 mg/dL. Levels above 240 mg/dL are considered high and should be treated through exercise, weight loss, improved diet and, if necessary, medication.

Tissue plasminogen activator
See recombinant tissue plasminogen activator (rt-PA).

Transient ischemic attack
This short-lived "mini-stroke" lasts from a few minutes up to 24 hours. While a TIA causes no lingering effects, it is an important risk factor for an acute stroke in the future.

Triglycerides
Triglycerides are the chemical form in which most fat exists in food as well as in the human body. Along with cholesterol, triglycerides form the plasma lipids. A normal level is less than 150 mg/dL.

Triglycerides in the blood come from fats in the food we ingest or are made by the body out of other energy sources, such as carbohydrates. If a person eats more calories than he/she needs, they are converted to triglycerides and transported to fat cells to be stored. High levels are linked to coronary artery disease and may be a consequence of other diseases, such as diabetes.

Printed by Authority of the State of Illinois
P. O. #356648 1M 8/06